

FIG._3

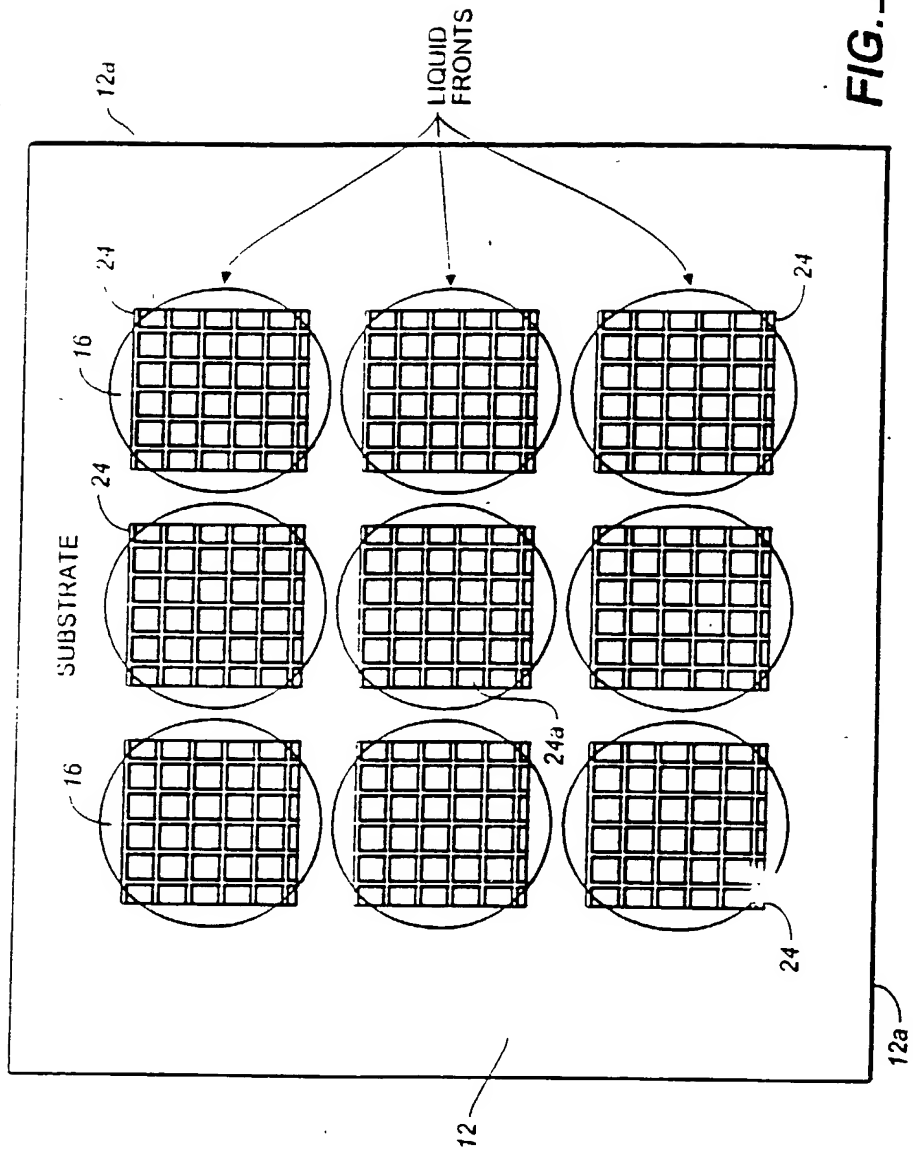
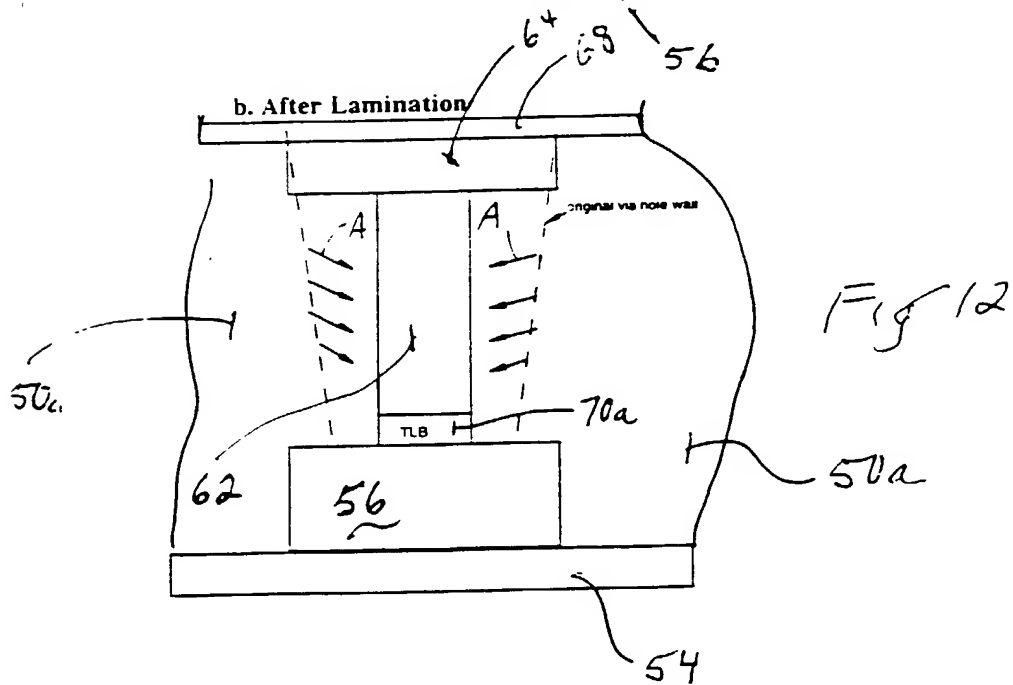
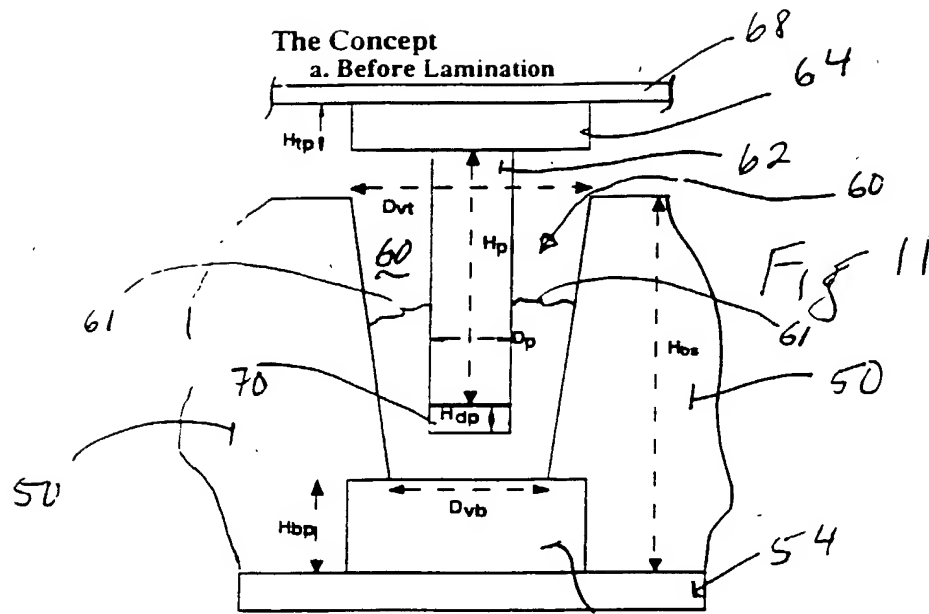
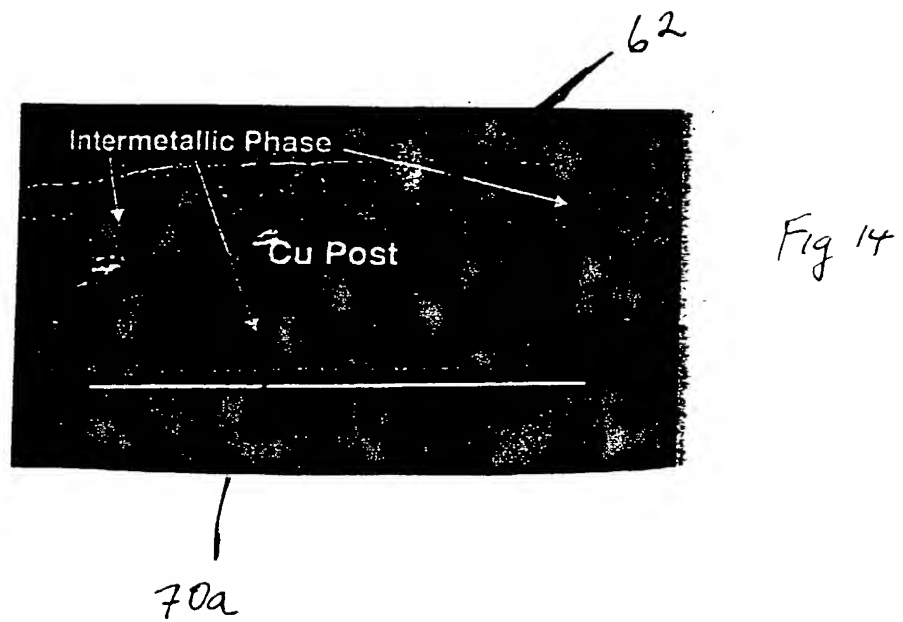
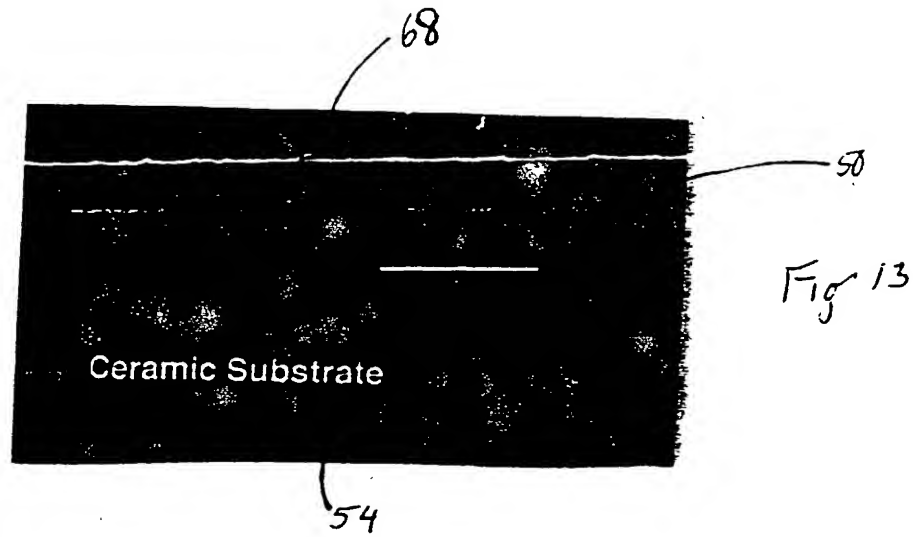
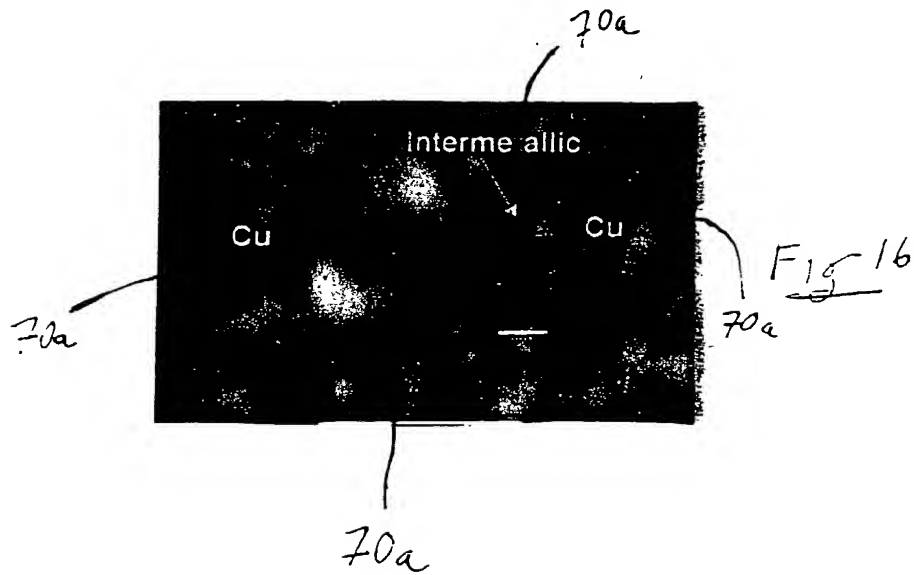
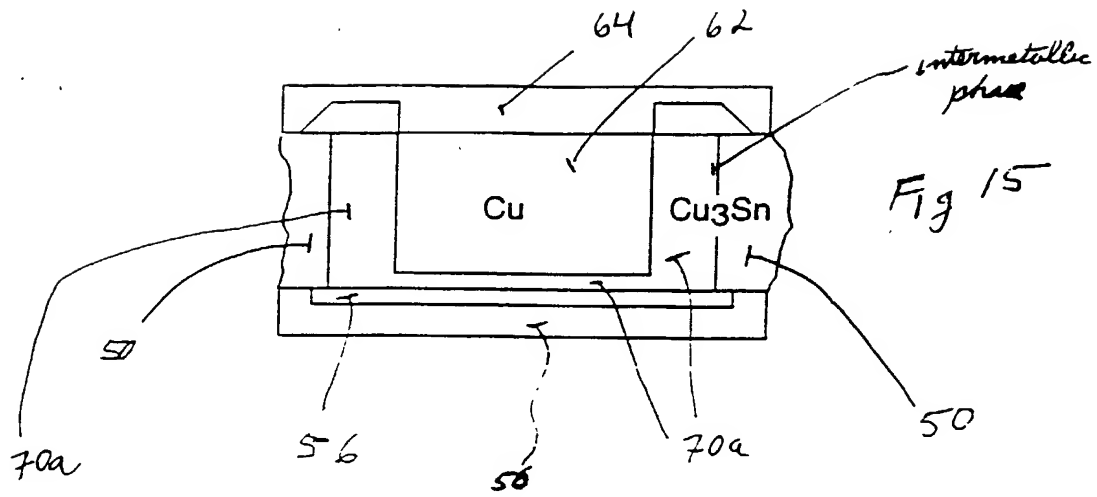


FIG. 4







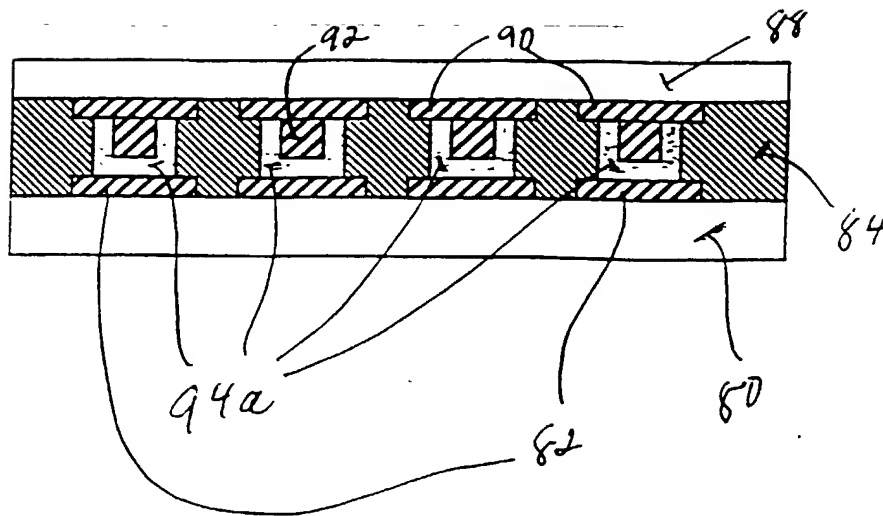


Fig 21

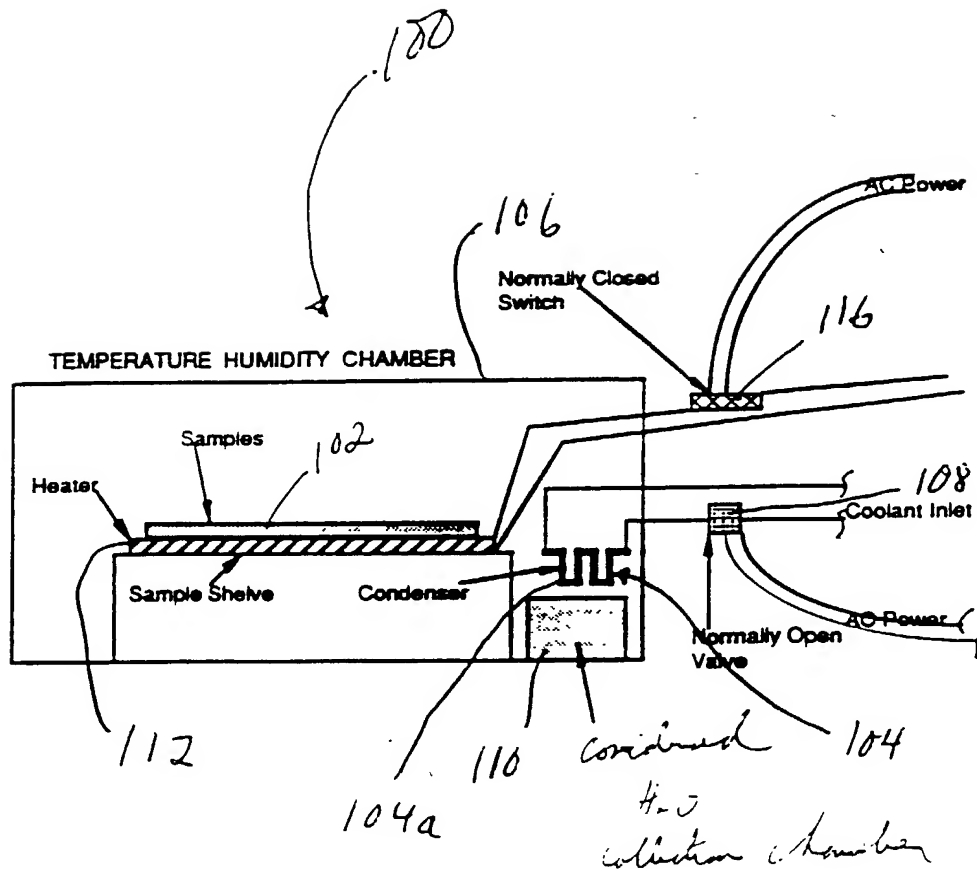


Fig 22

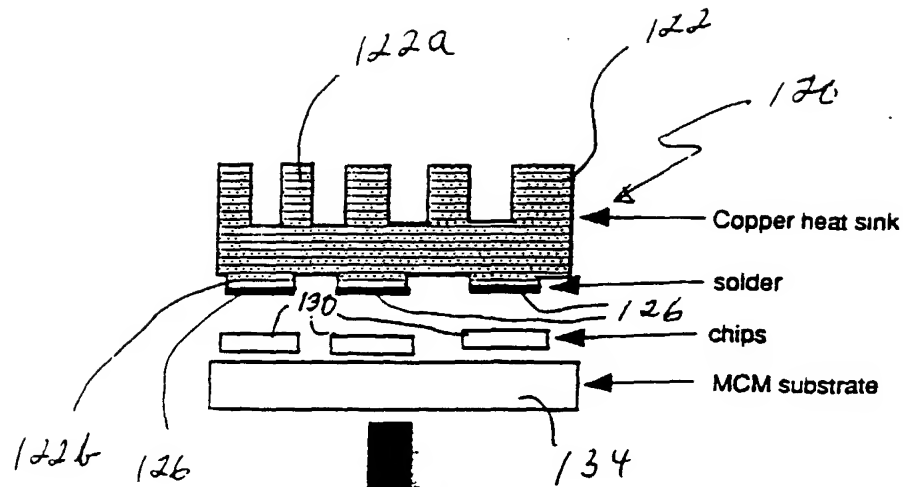


Fig. 23

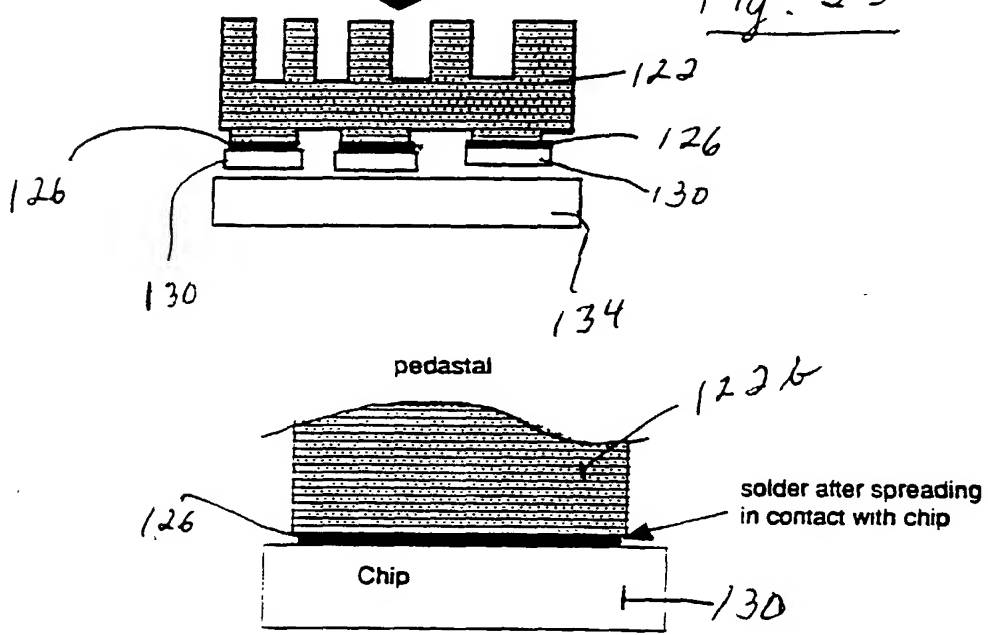
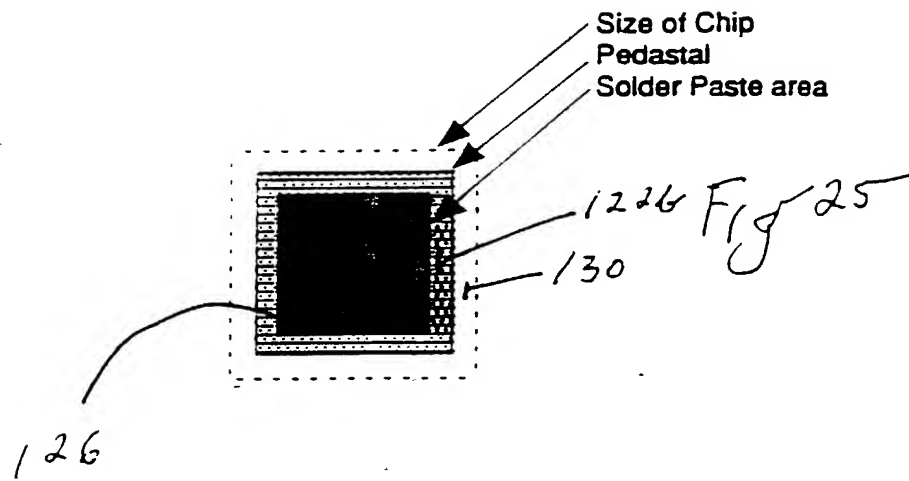
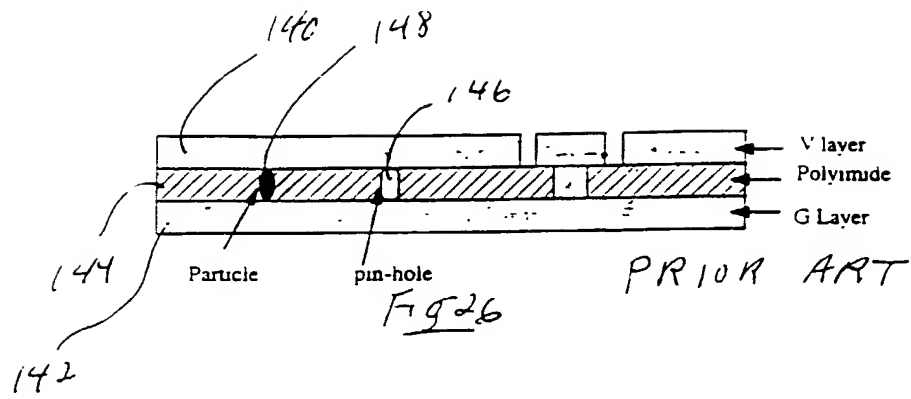


Fig 24





The New Process

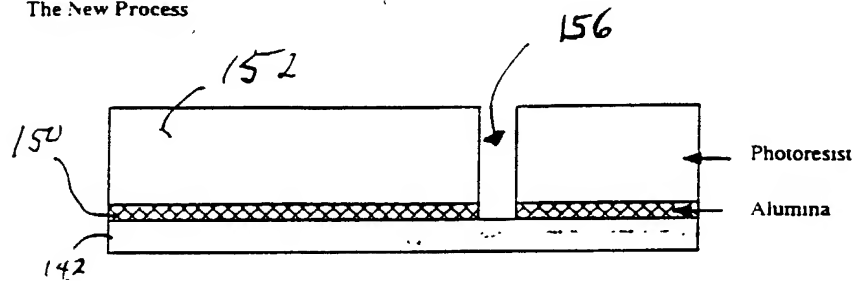


Fig 27

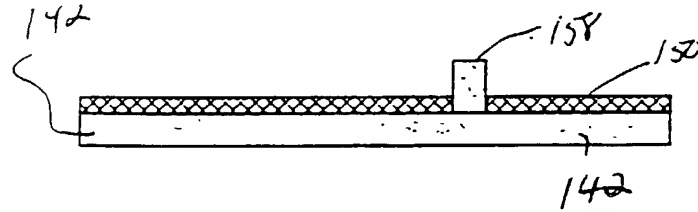
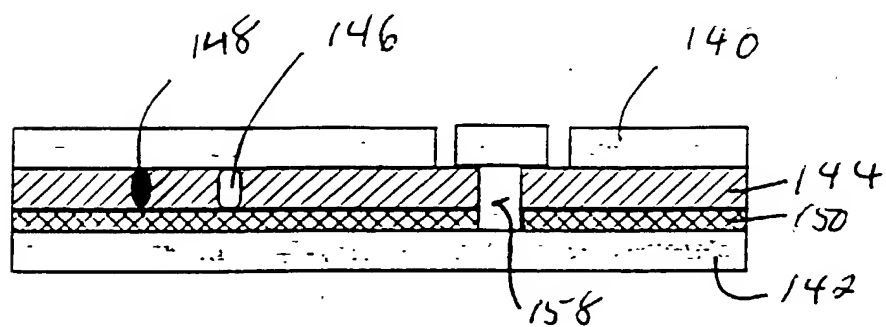
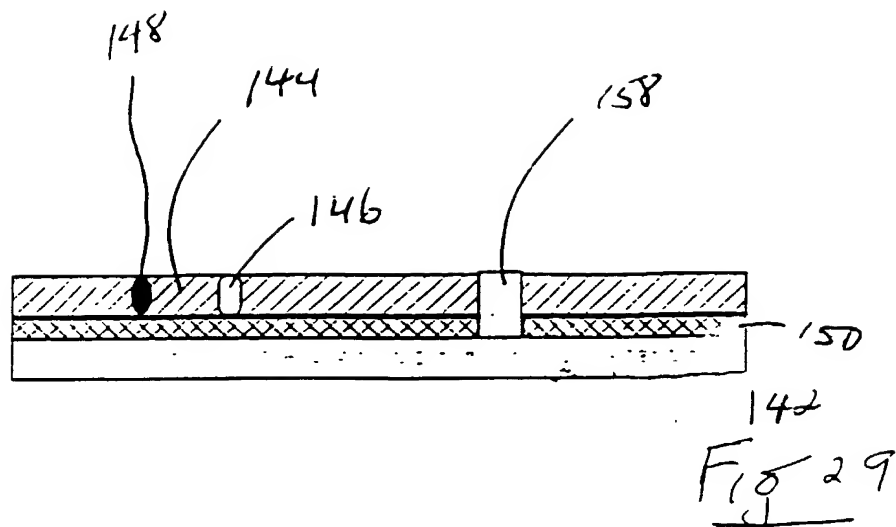
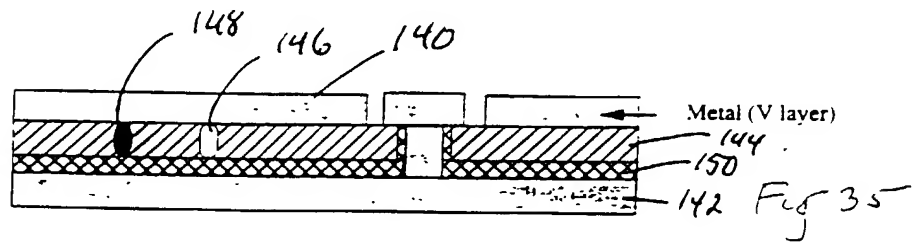
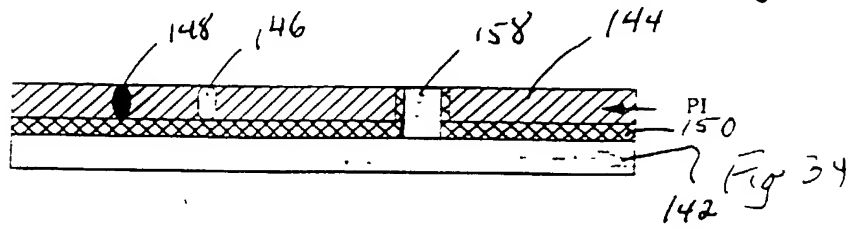
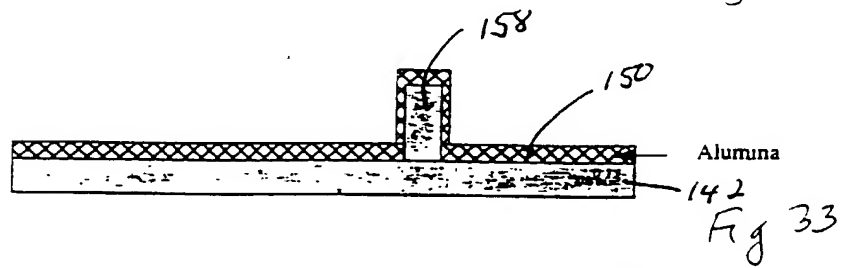
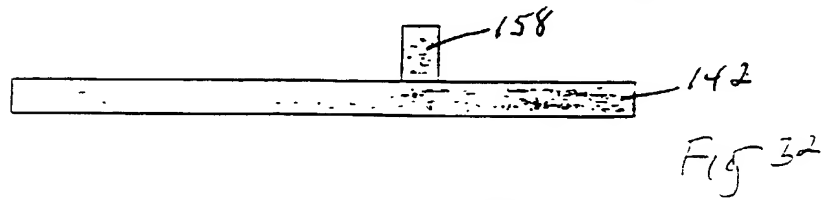
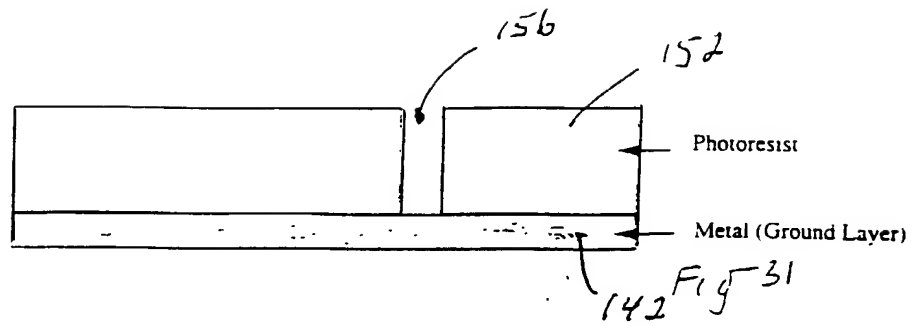


Fig 28





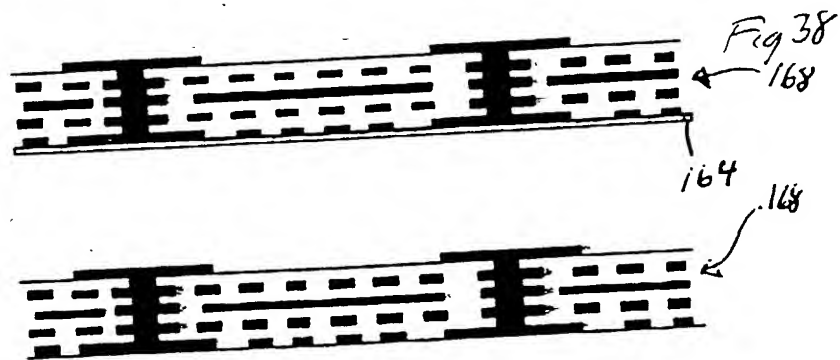
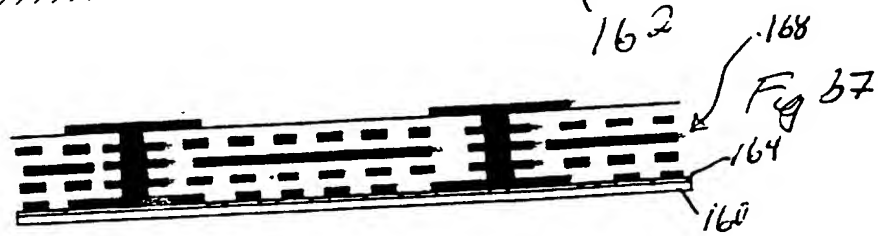
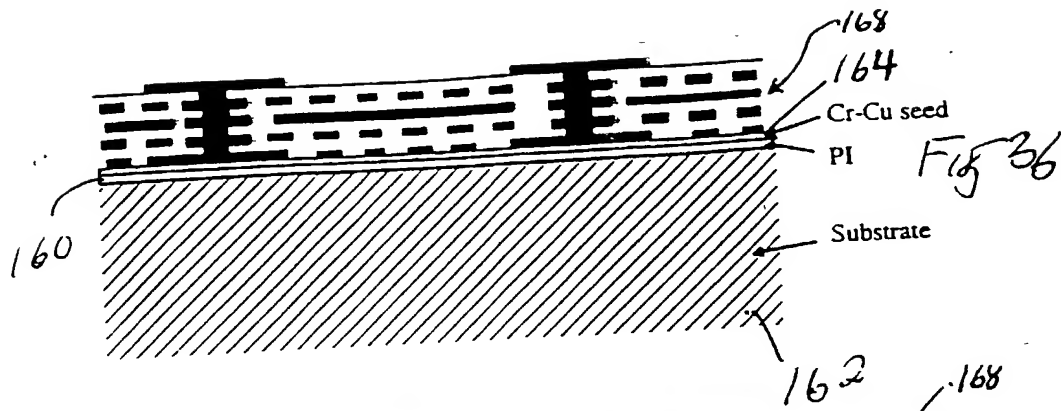
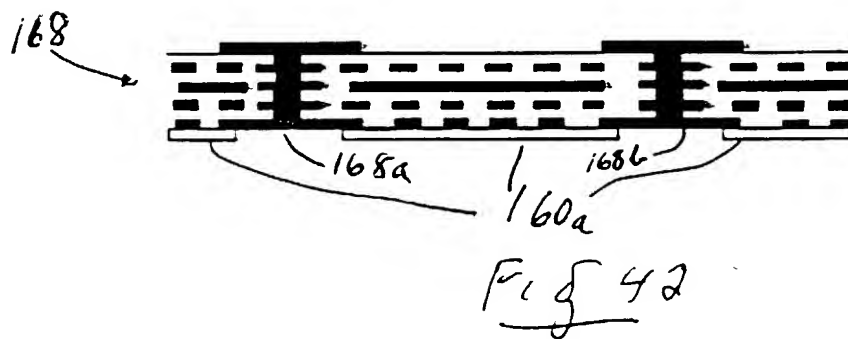
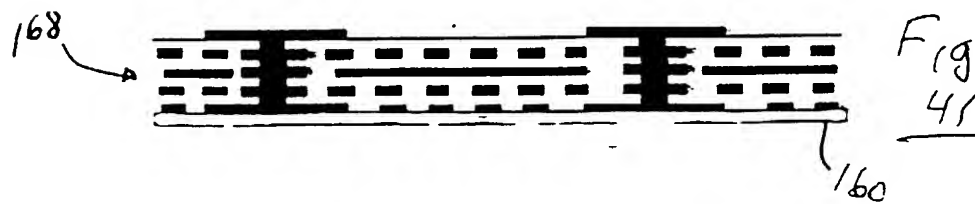
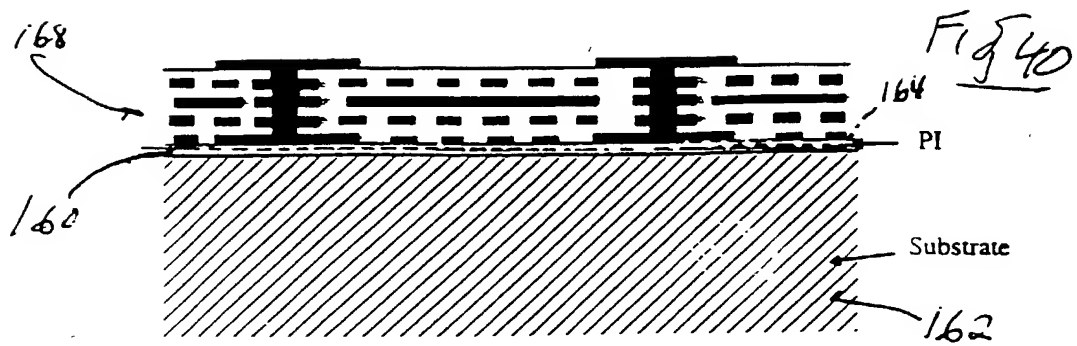


Fig 39



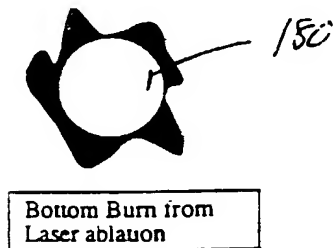
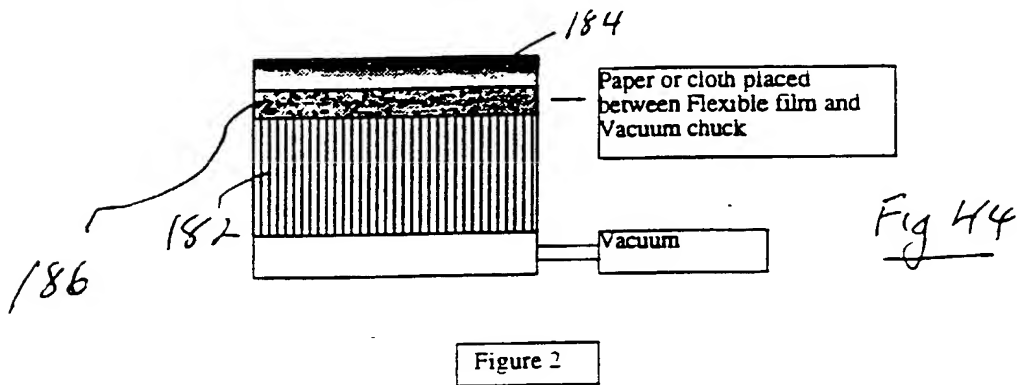
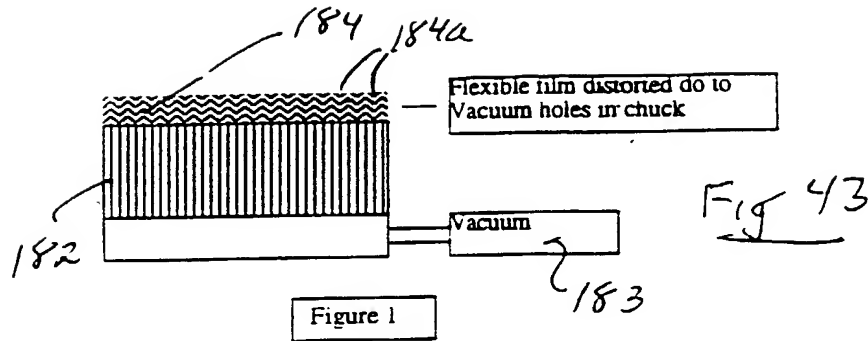


Figure 3

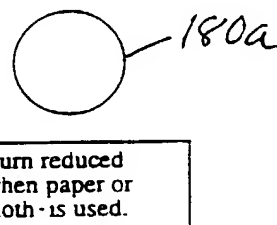
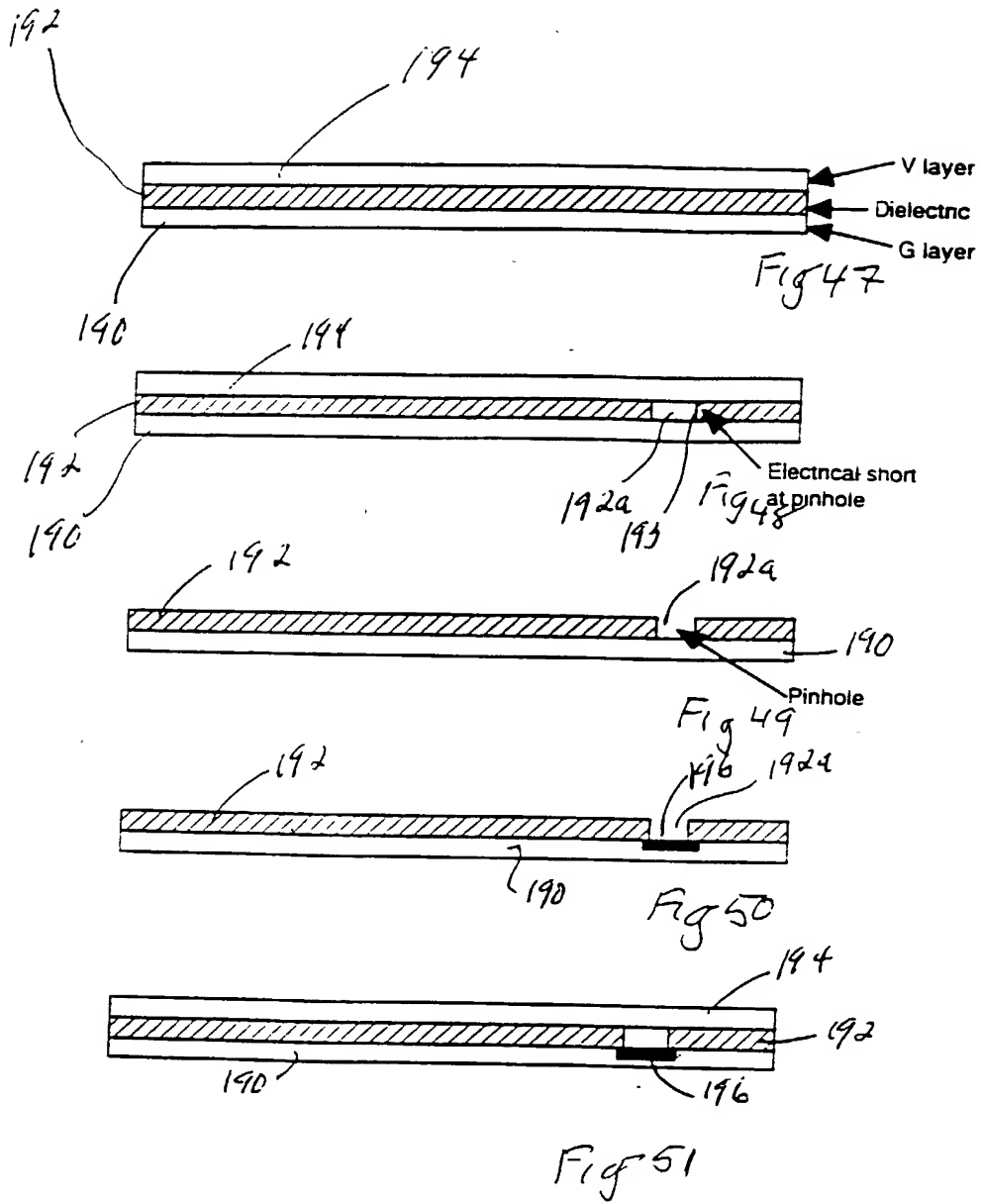
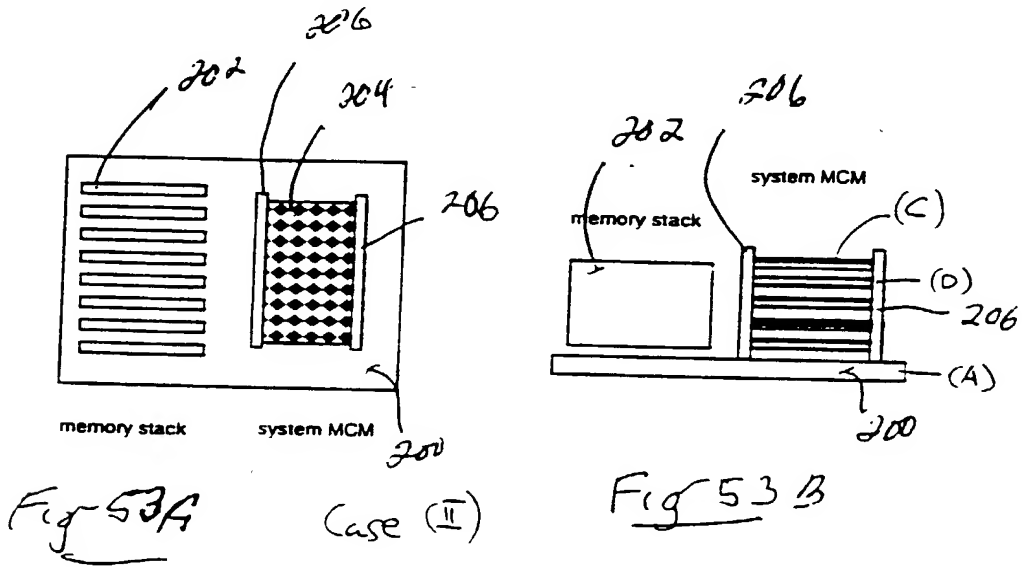
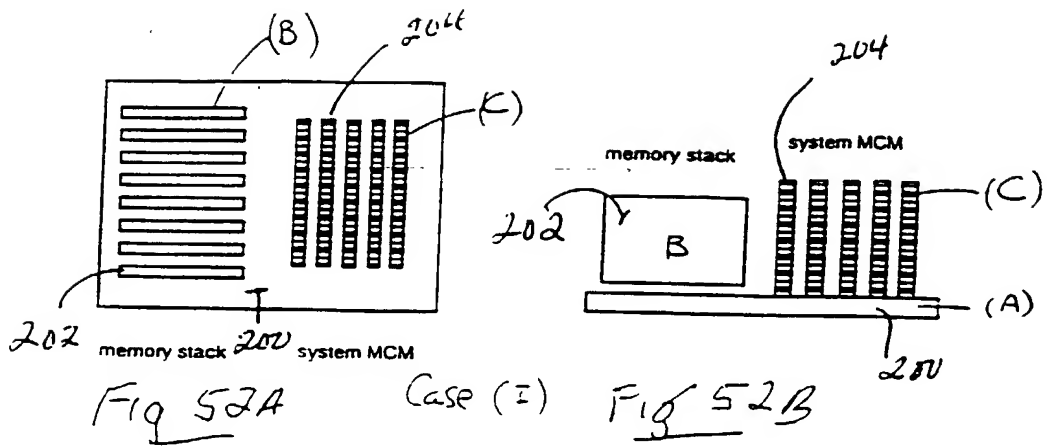


Figure 4

Fig 45

Fig 46





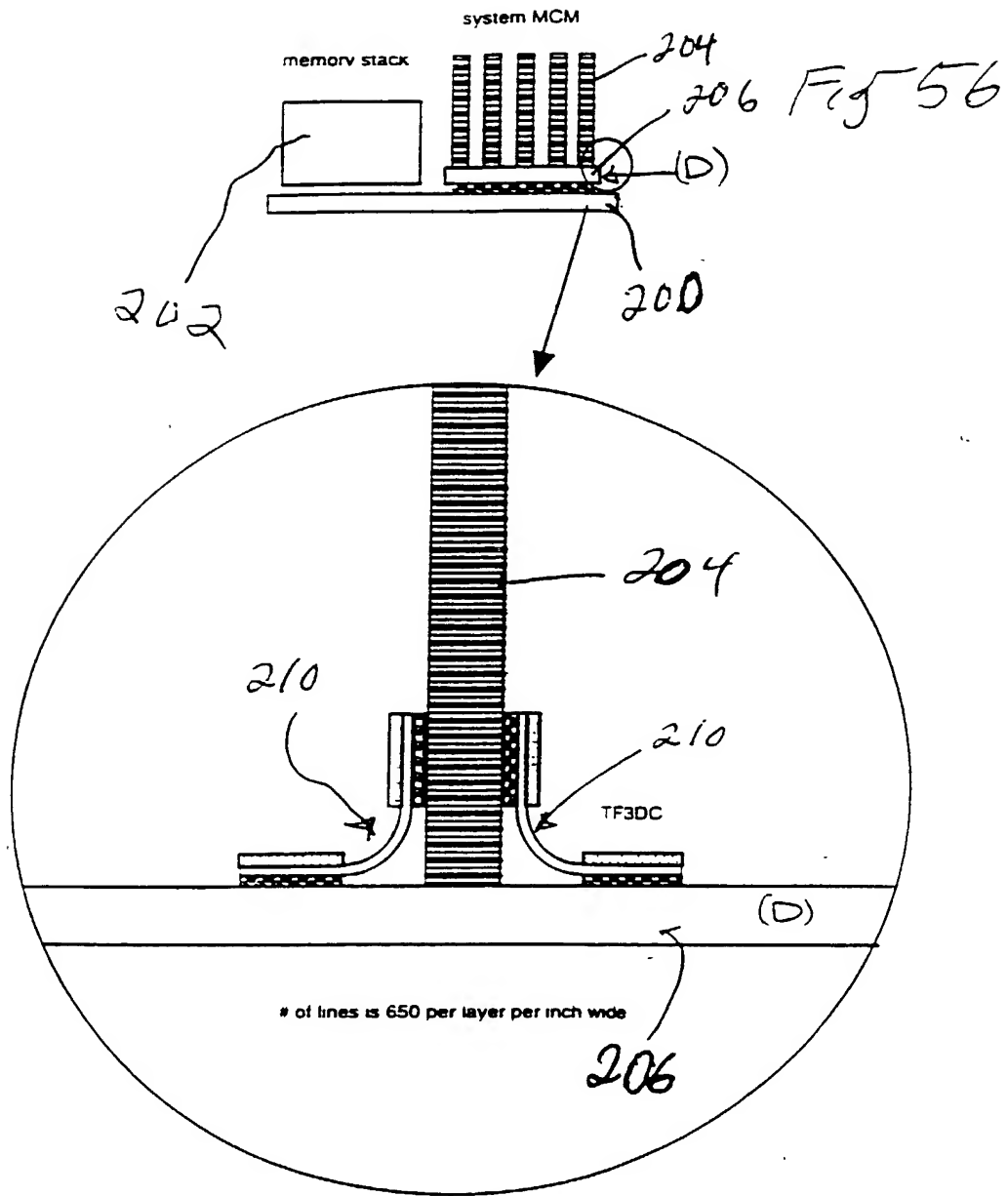


Fig 57

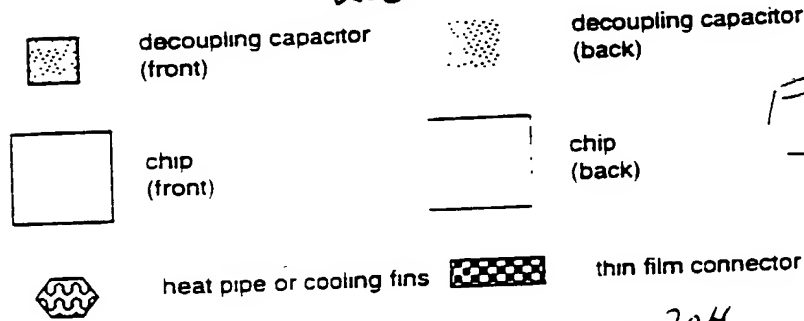
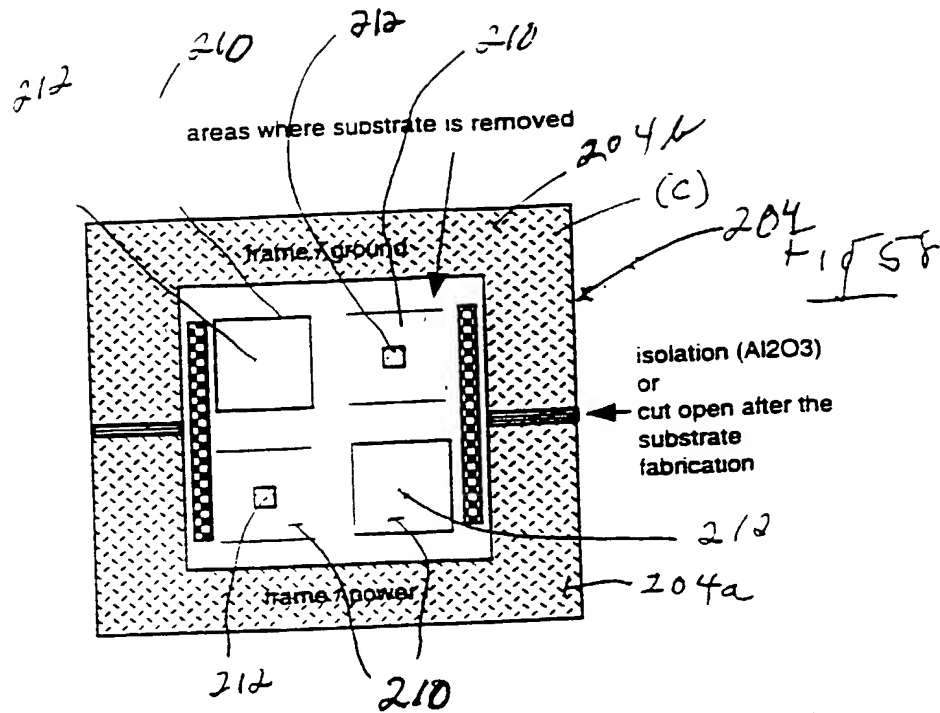
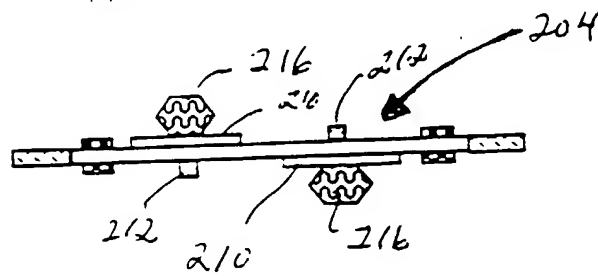
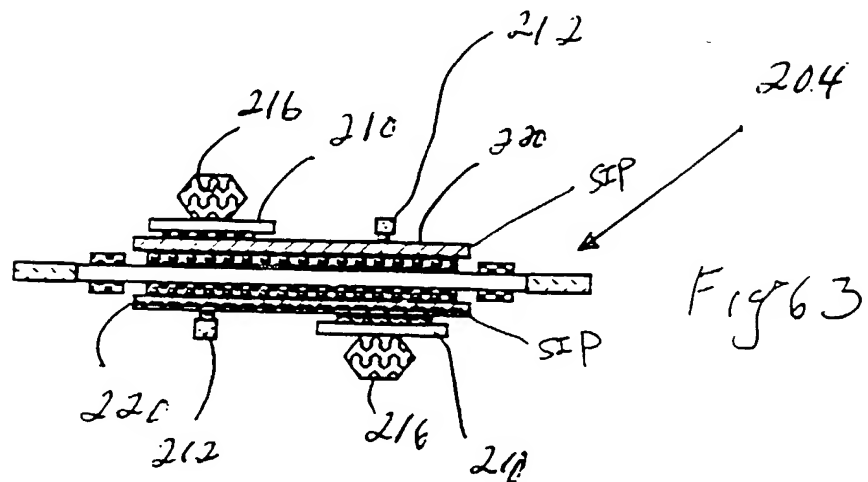
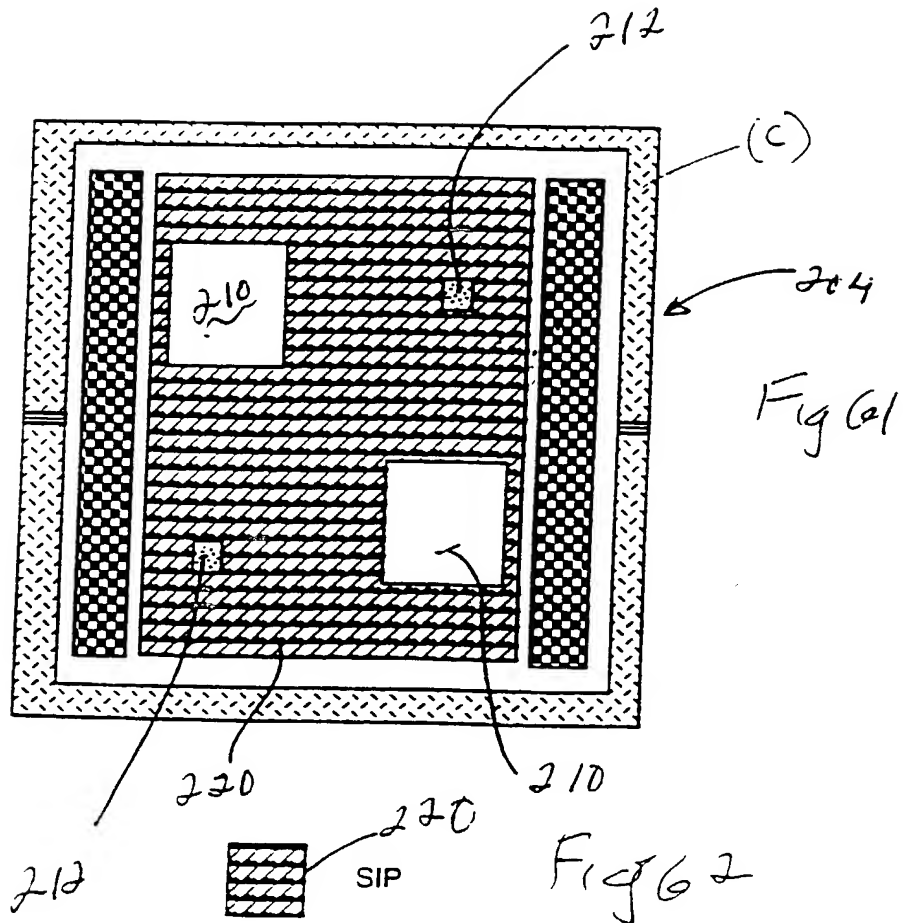
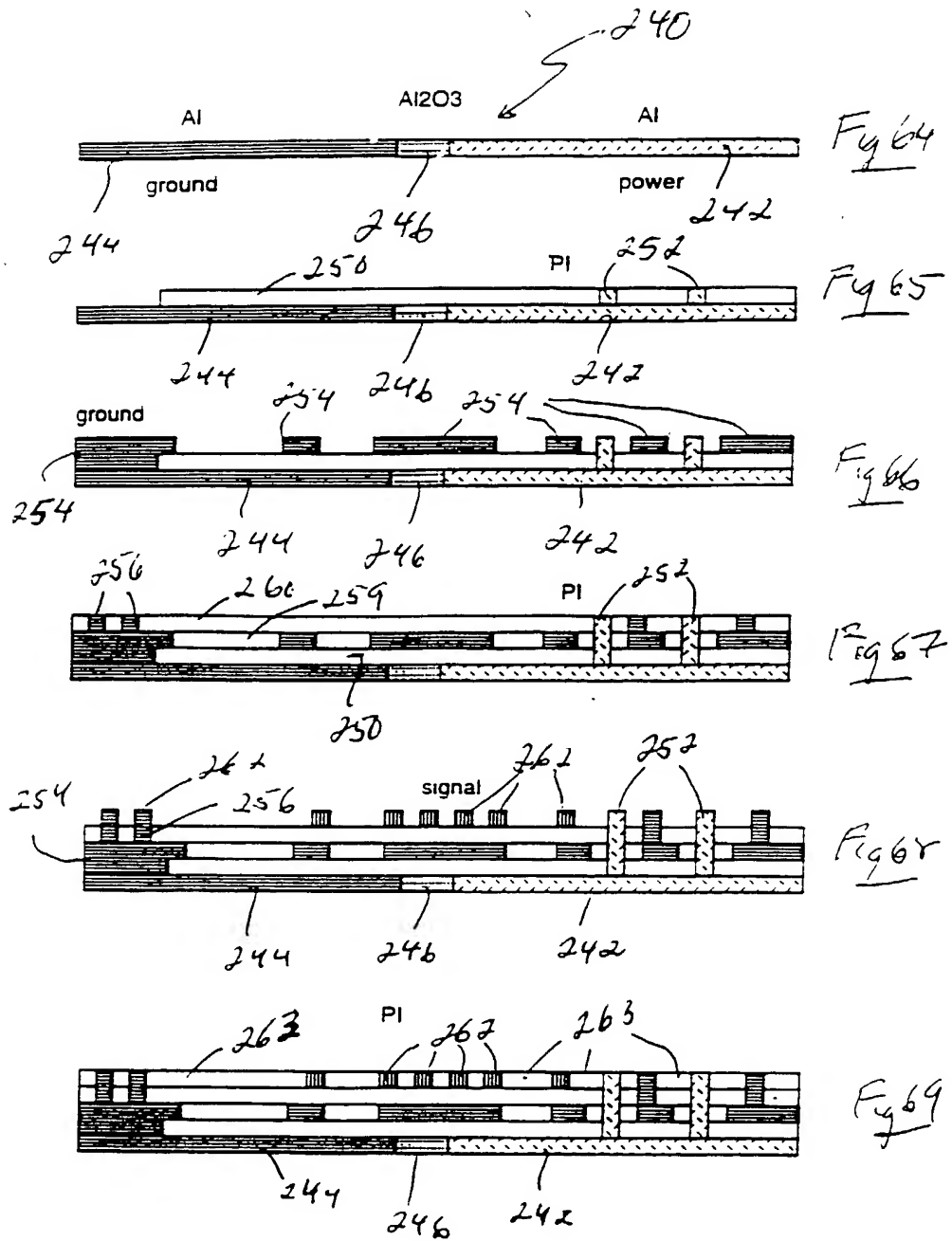


Fig 59







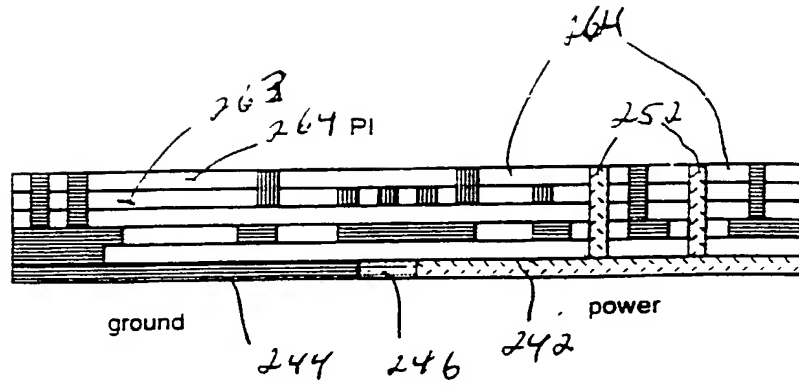


Fig 70

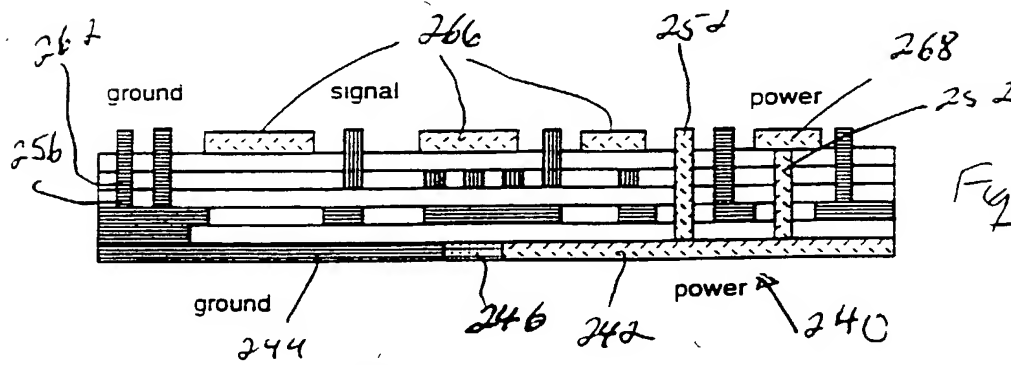


Fig 71

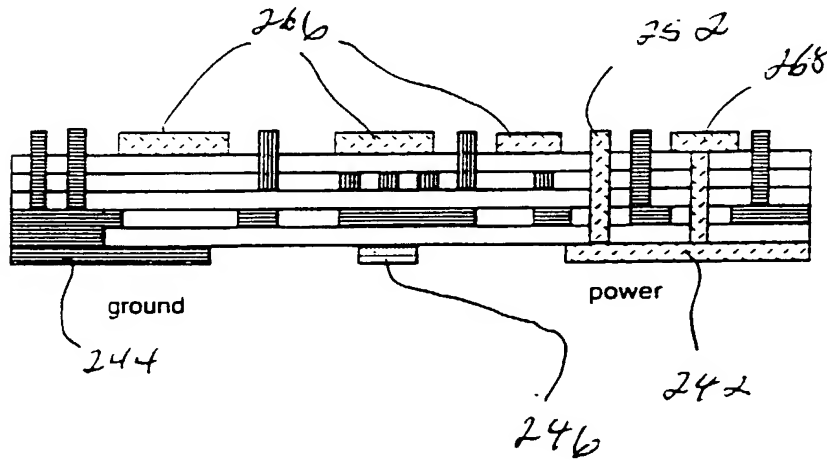
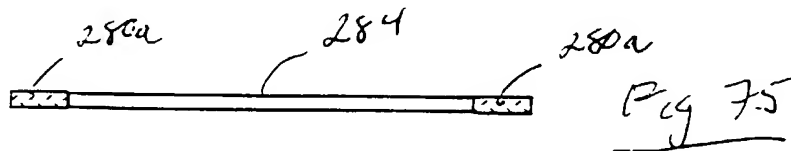
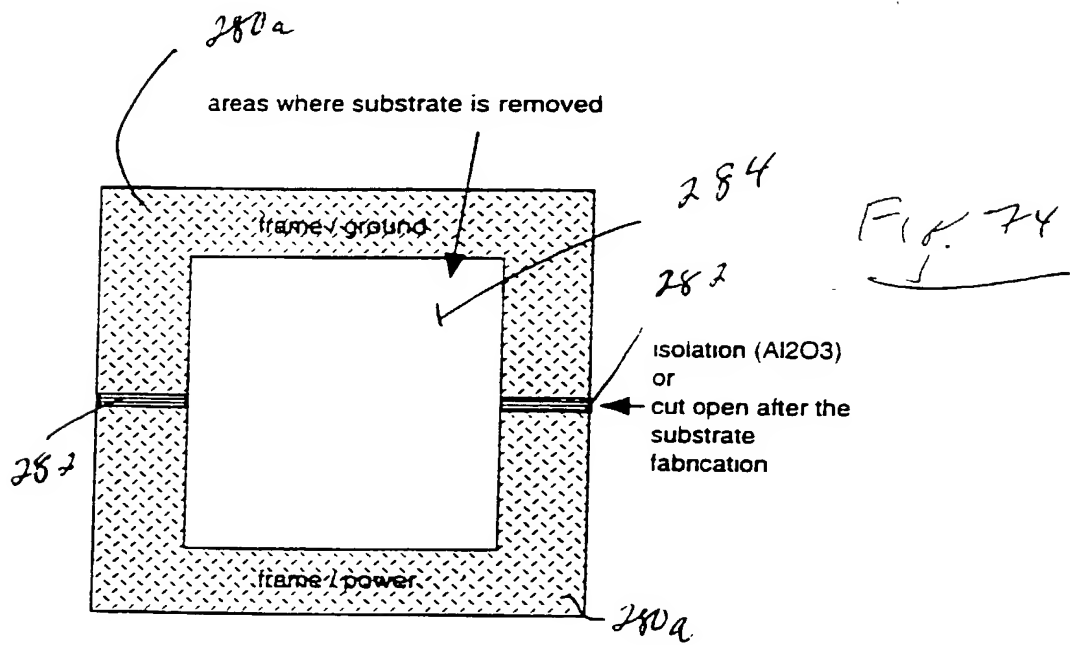
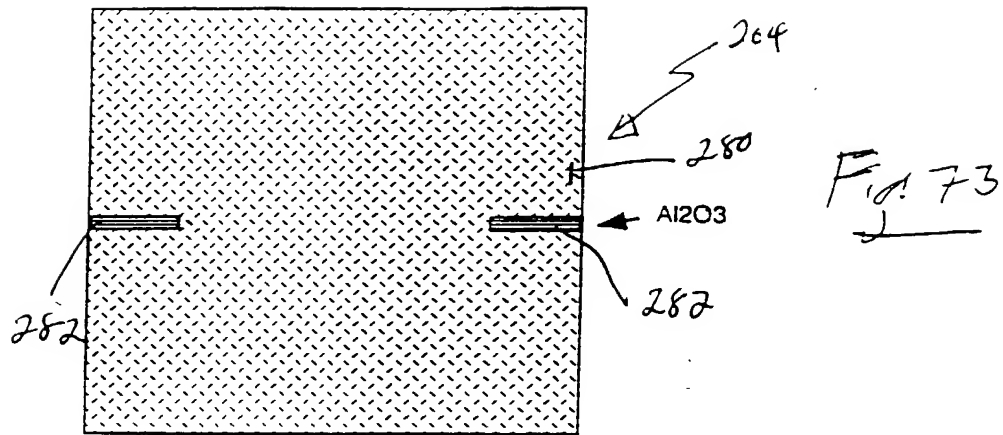
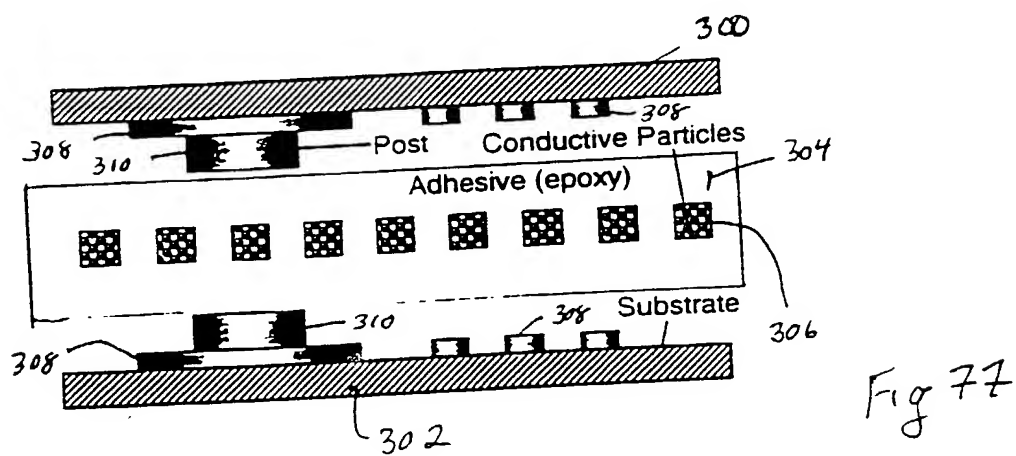
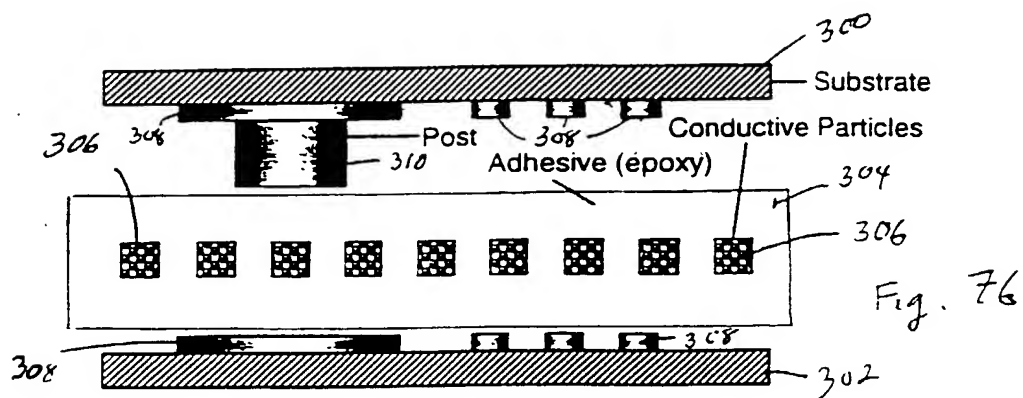


Fig 72





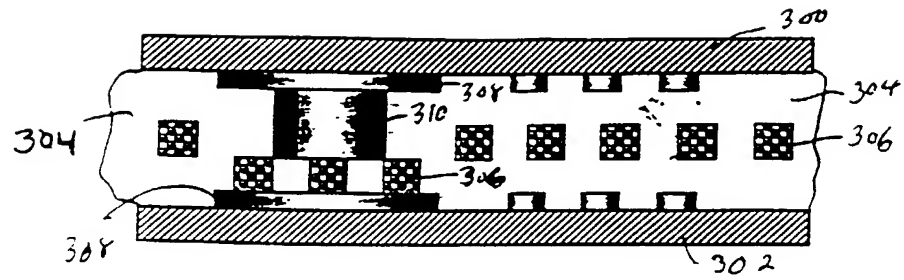


Fig 78

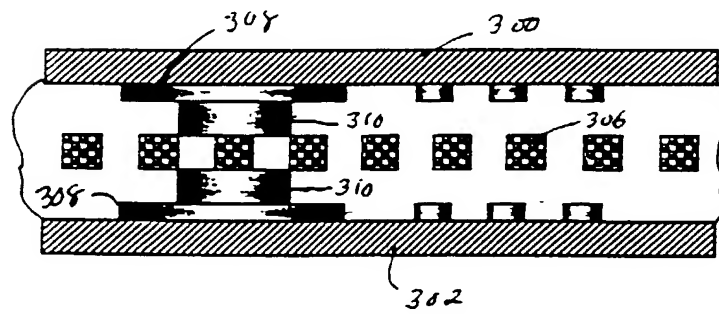
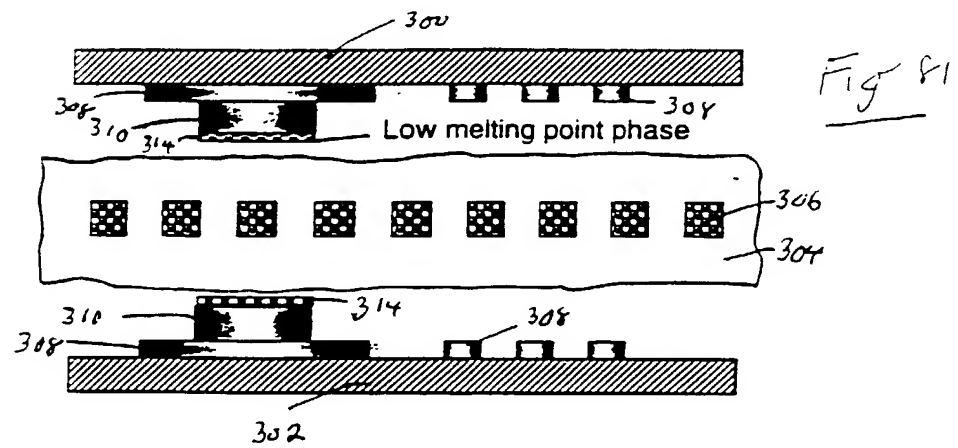
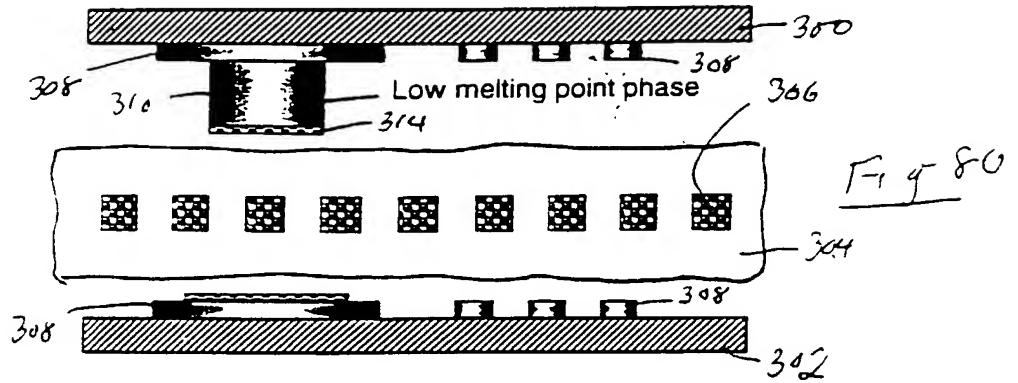


Fig 79



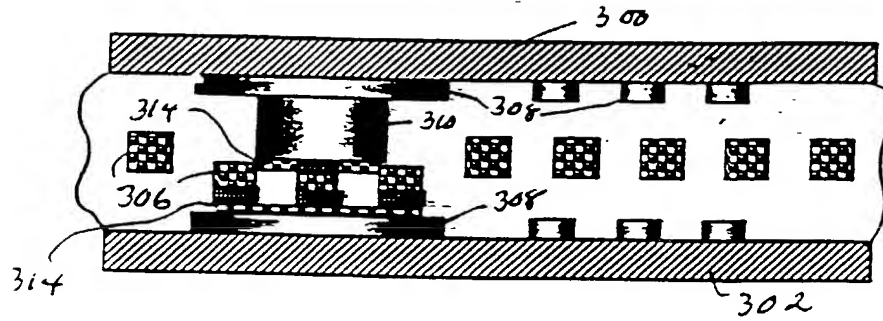


Fig 82

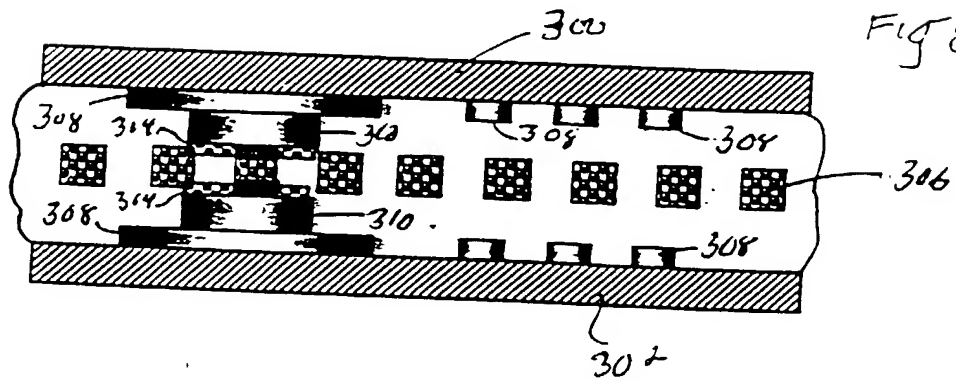


Fig 83

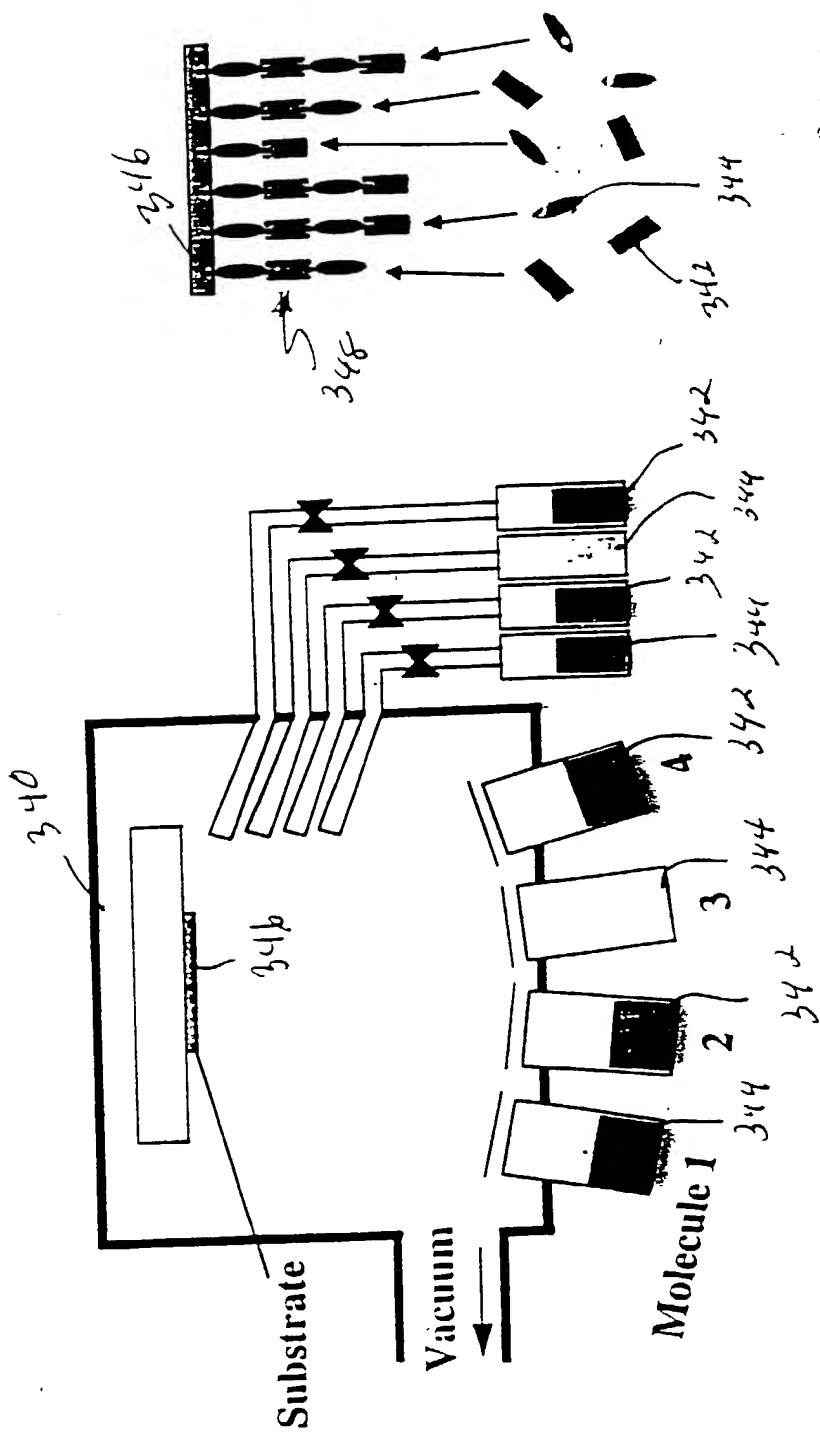
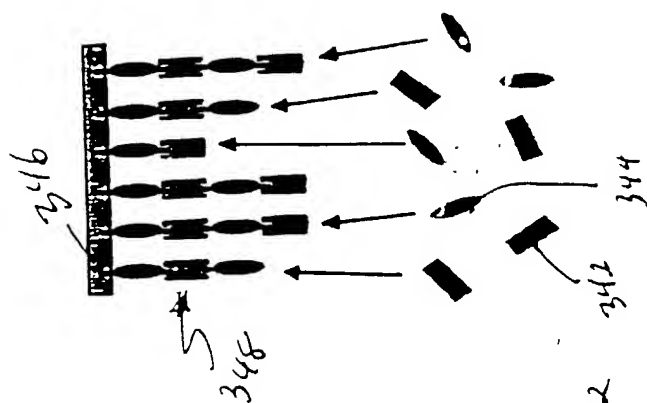
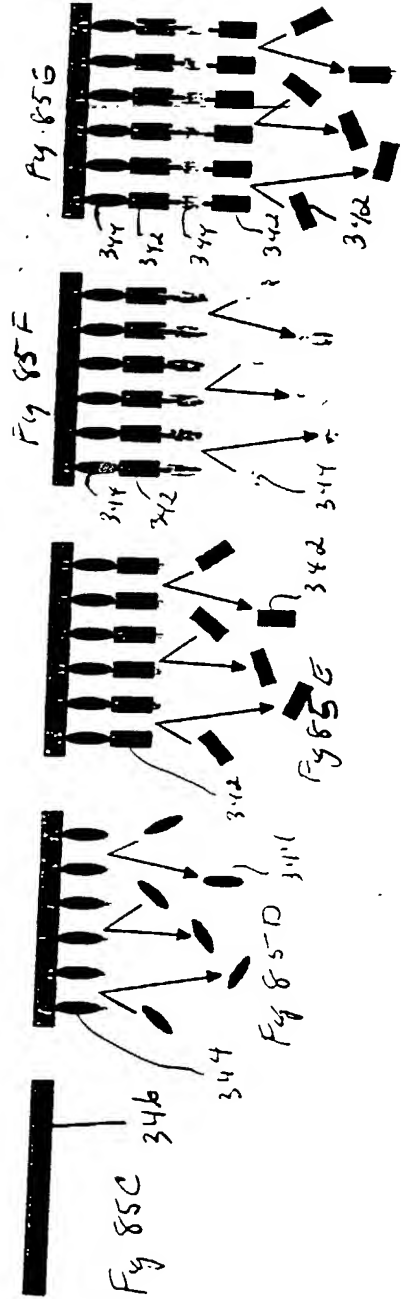
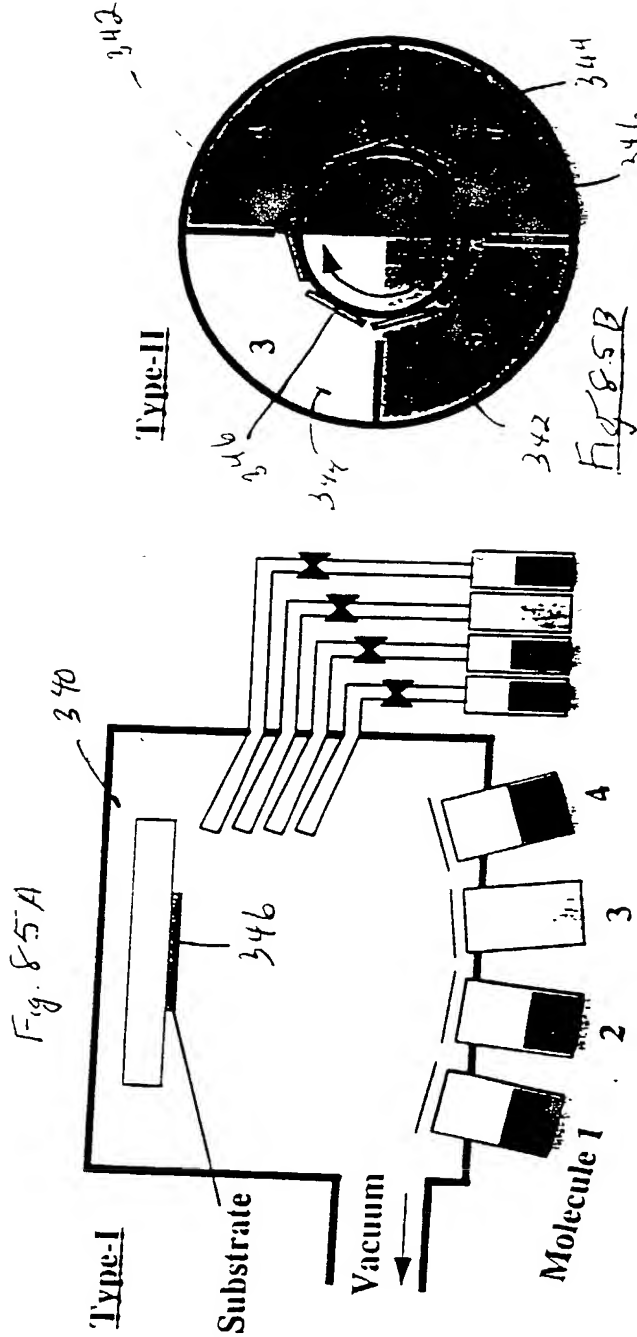


Fig 84A

Fig-84B





Vapor Phase Deposition Vs. Spin coating

	Spin coating	Vapor Phase Deposition	
		CVD	MLD
-Coverage Controllability	Low	High	High
-Thickness Accuracy/Uniformity	Low	Medium	High
-Deposition Rate	High	Medium	Low
-Molecular-level Controllability	Low	Medium	High
-Selective Deposition	No	Yes	Yes
-Selective Molecular Alignment	No	Yes	Yes

(High & Yes are preferable)

-Conformable coverage and Thickness accuracy/uniformity

-CVD/MLD are superior to Spin Coating

-Low ϵ insulator with strong adhesion

-MLD may provide high adhesion with the Molecular-Level Controllability

-Options

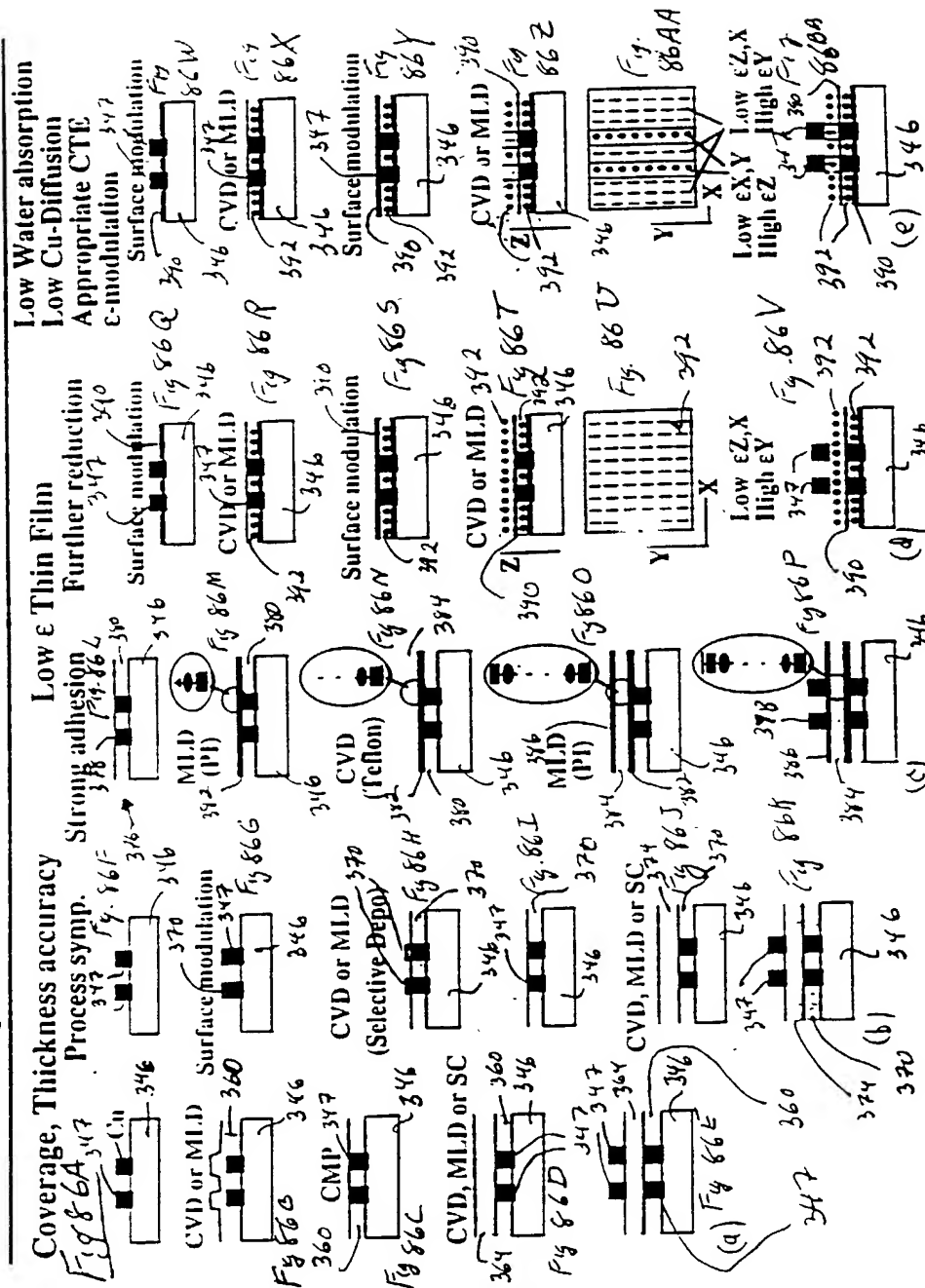
-CVD/MLD can do # Selective Deposition (hydrophilic/hydrophobic surface)

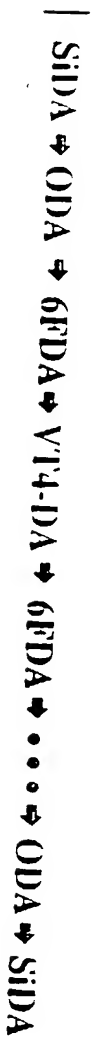
Selective Molecular Alignment (surface treatment)

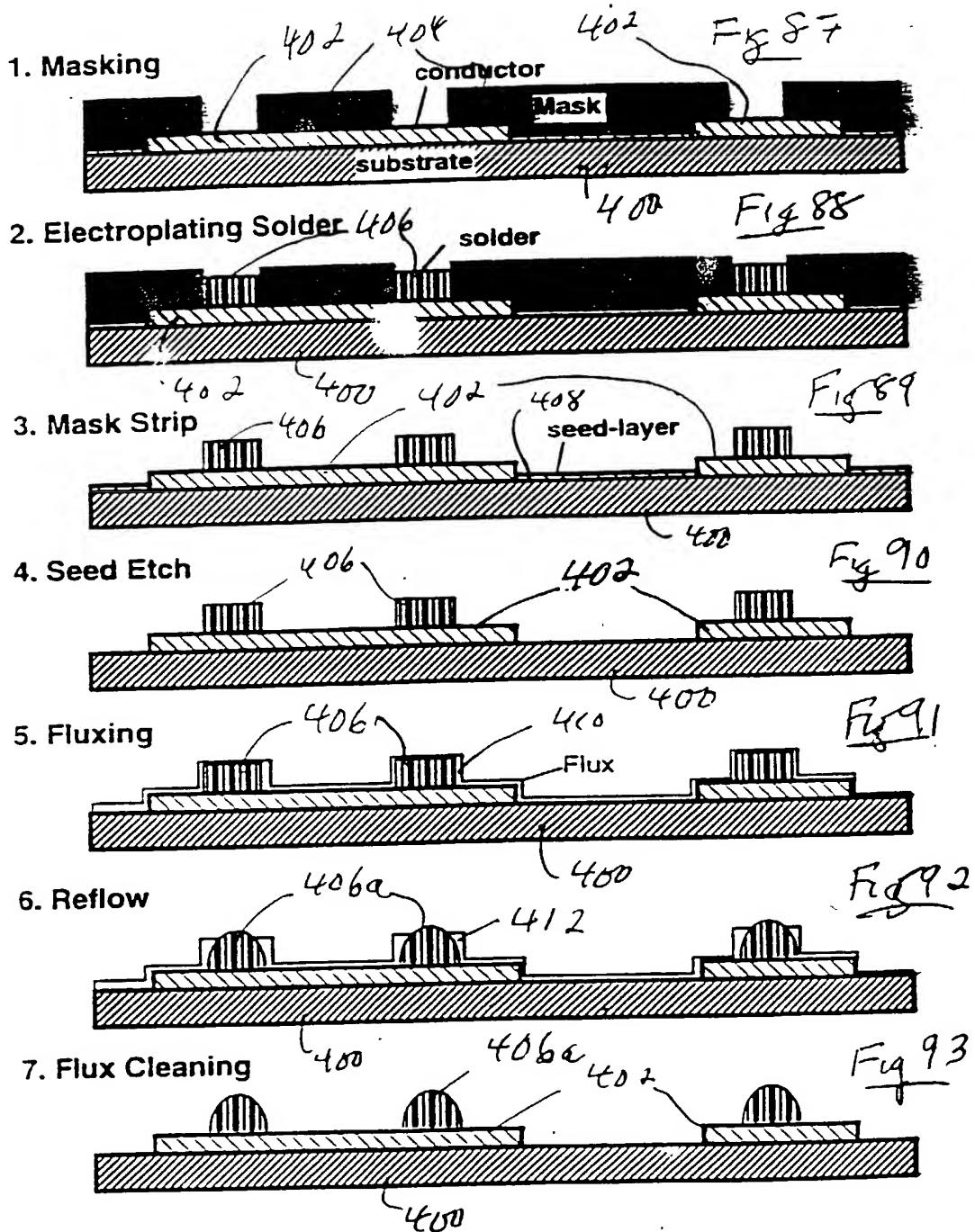
may provide further ϵ reduction, process simplification, and low Cu-diffusion

Fig 85H

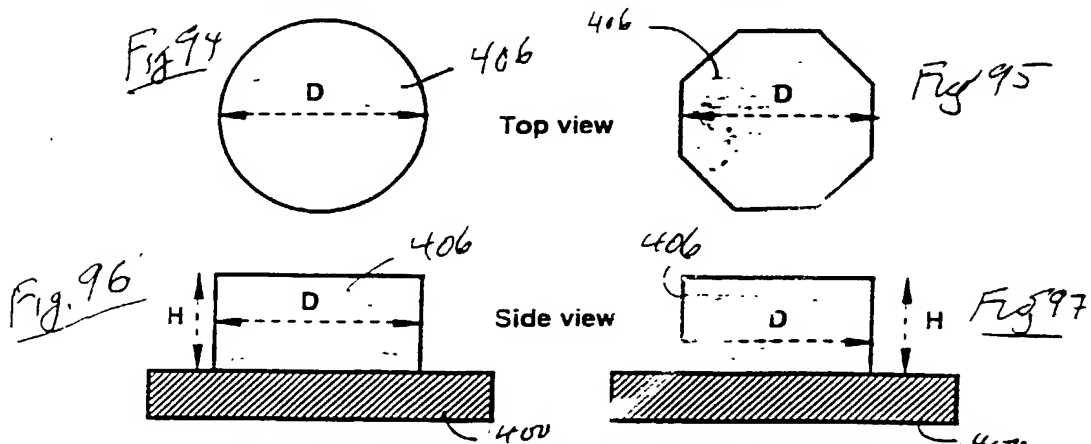
Examples of MLD & CVD application to MCM processes



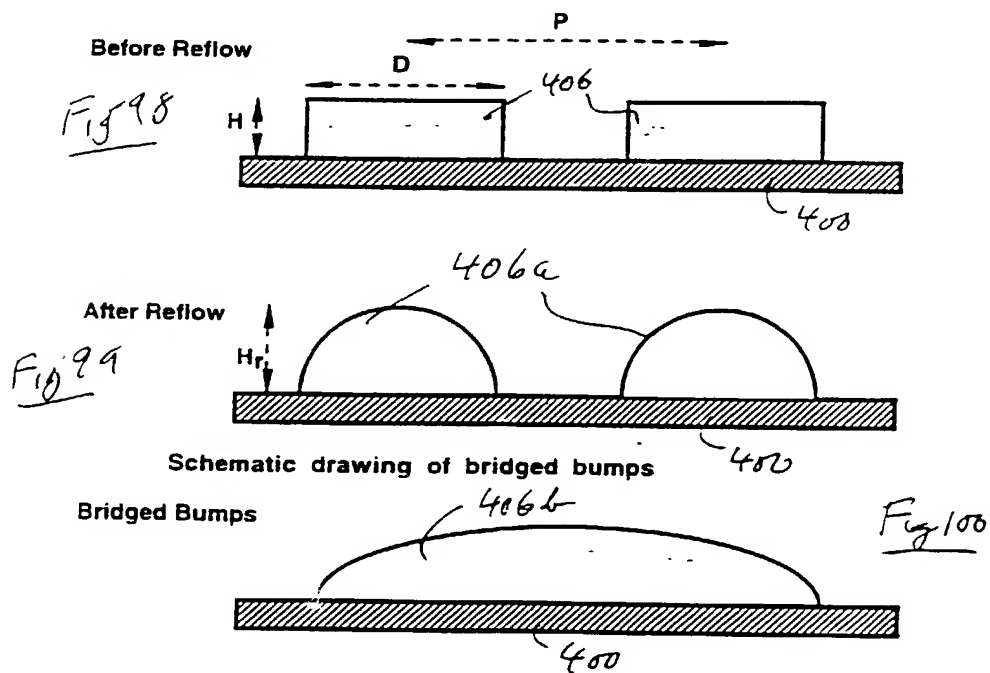




Geometric dimensions of the electroplated bumps.



Geometric shape change of electroplated solder bumps by reflow process



Direct Plating Process

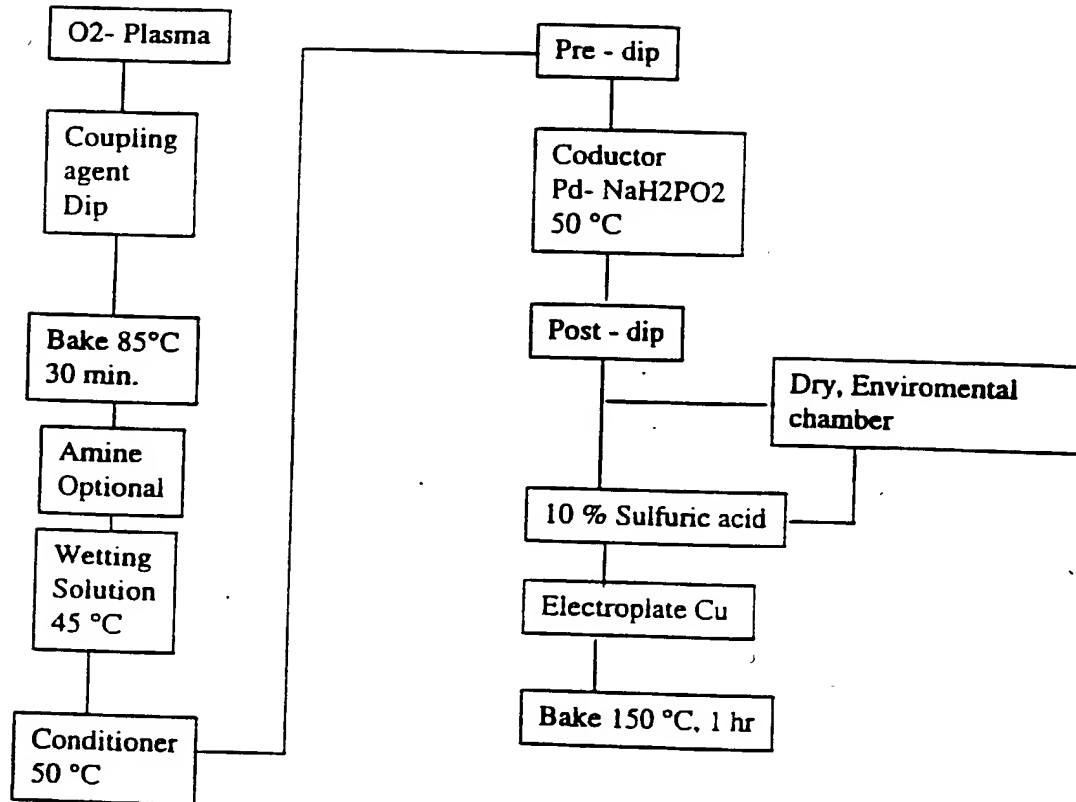
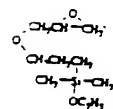
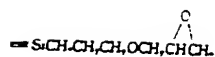
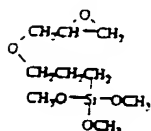


Fig 101A

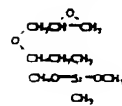
Fig 101B



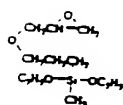
(3-GLYCIDOXYPROPYL)DIMETHYLETHOXY-
SILANE
 $\text{C}_{10}\text{H}_{22}\text{O}_3\text{Si}$



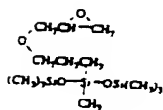
(3-GLYCIDOXYPROPYL)TRIMETHOXY-SILANE
3-(2,3-EPOXYPROPOXY)PROPYLTRIMETHOXY-SILANE
 $\text{C}_9\text{H}_{20}\text{O}_5\text{Si}$



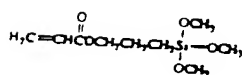
(3-GLYCIDOXYPROPYL)METHYLDIMETHOXY-
SILANE
 $\text{C}_9\text{H}_{20}\text{O}_4\text{Si}$



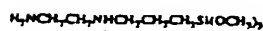
(3-GLYCIDOXYPROPYL)METHYLDIETHOXY-
SILANE
 $\text{C}_{11}\text{H}_{24}\text{O}_4\text{Si}$



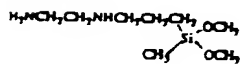
(3-GLYCIDOXYPROPYL)BIS(TRIMETHYL-
SILOXY)METHYLSILANE
 $\text{C}_{13}\text{H}_{32}\text{O}_4\text{Si}_3$



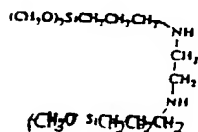
(3-ACRYLOXYPROPYL)TRIMETHOXY-
SILANE, 95%
 $\text{C}_9\text{H}_{18}\text{O}_5\text{Si}$



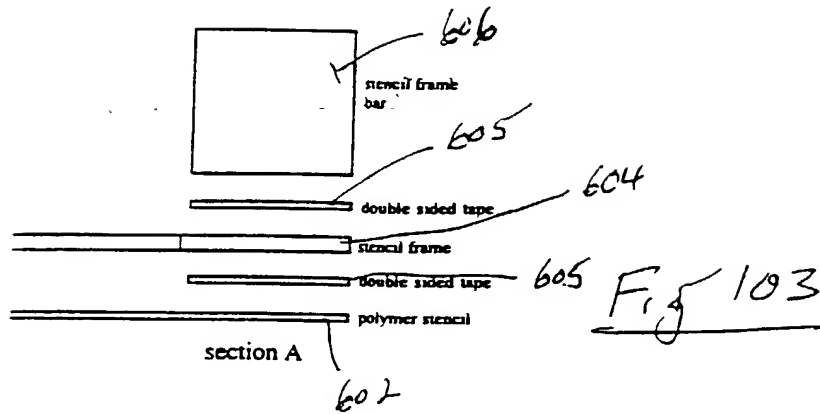
N-(2-AMINOETHYL)-3-AMINOPROPYLTRI-
METHOXY-SILANE
 $\text{C}_8\text{H}_{22}\text{N}_2\text{O}_3\text{Si}$



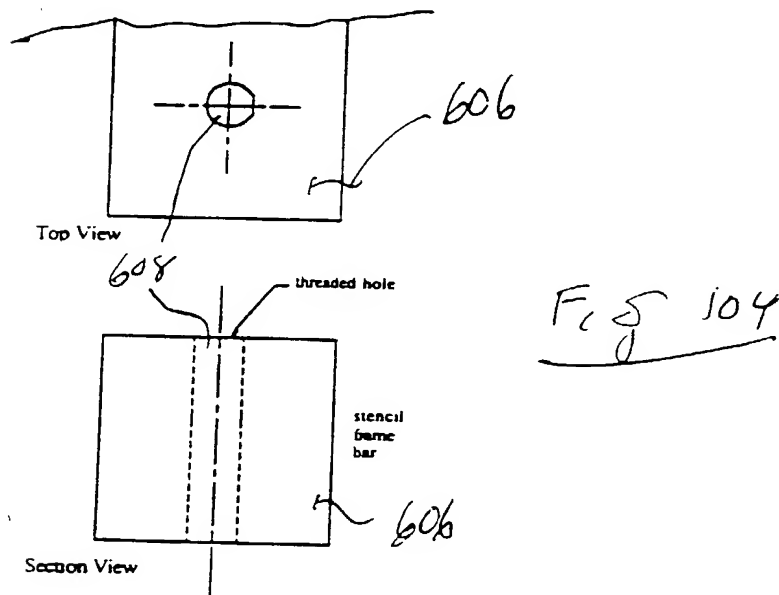
N-(2-AMINOETHYL)-3-AMINOPROPYLMETHYL-
DIMETHOXY-SILANE
 $\text{C}_8\text{H}_{22}\text{N}_2\text{O}_2\text{Si}$



BIS(3-TRIMETHOXY-SILYL)PROPYL-
ETHYLENEDIAMINE
 $\text{C}_{14}\text{H}_{36}\text{N}_2\text{O}_6\text{Si}_2$



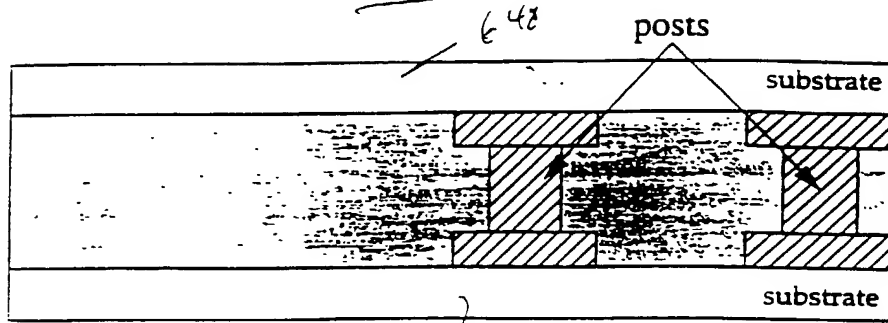
Section View of Stencil Frame Components.



Tapped Hole in Stencil Frame Bar.

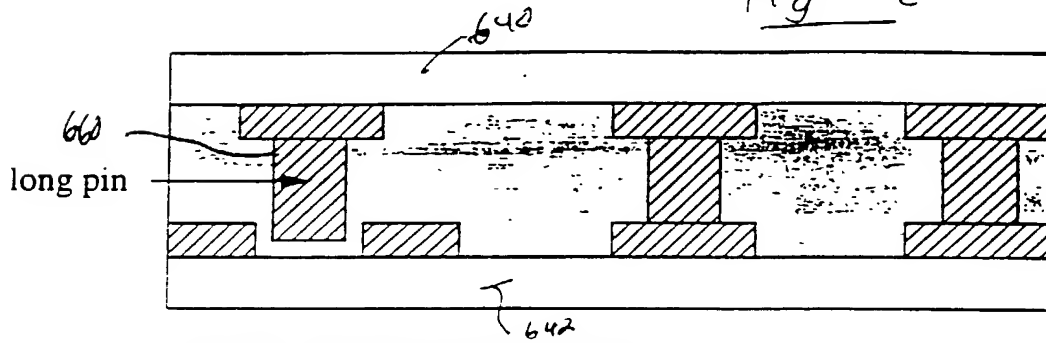
Traditional joining

Fig 105

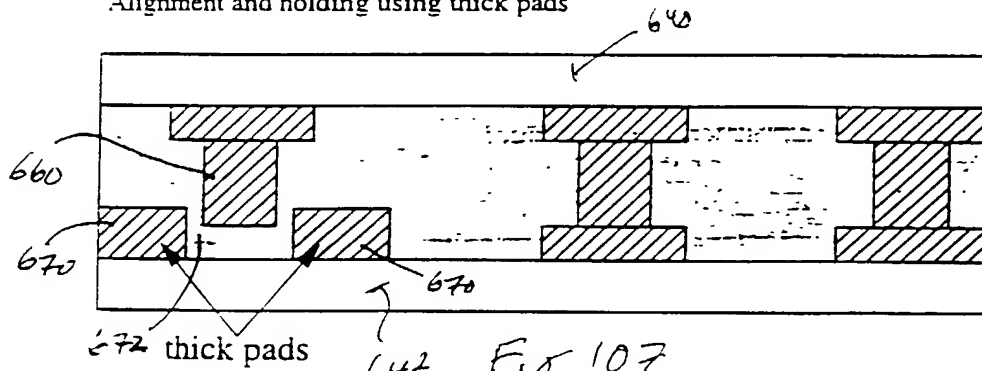


Alignment and holding using long pin

Fig 106



Alignment and holding using thick pads



Build-up process for long pin

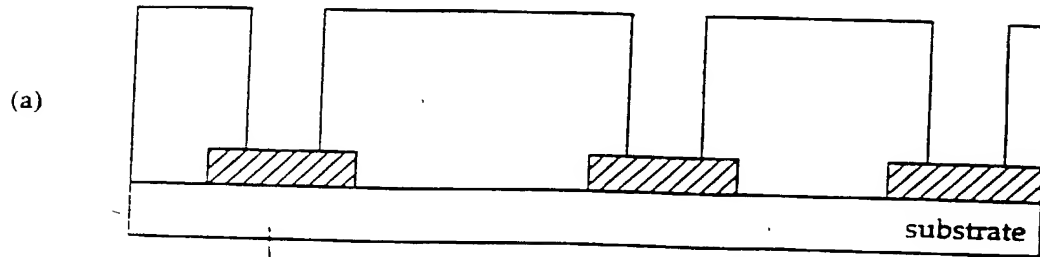
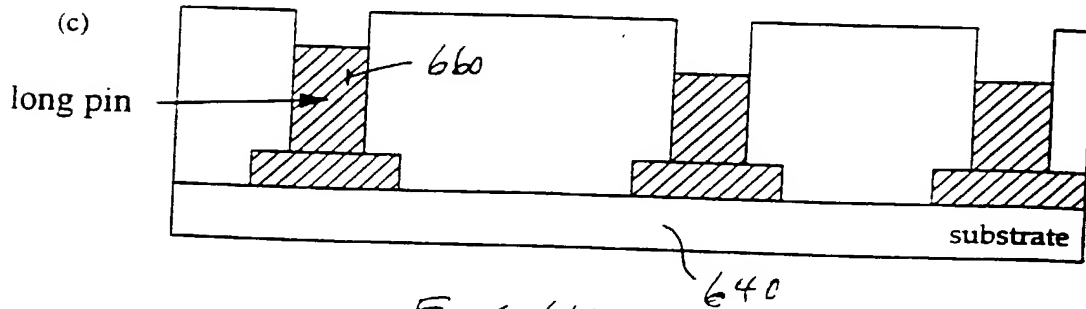
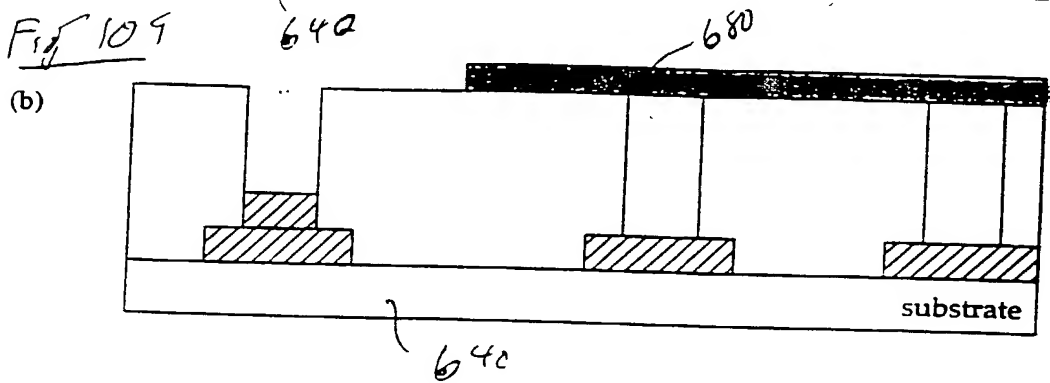
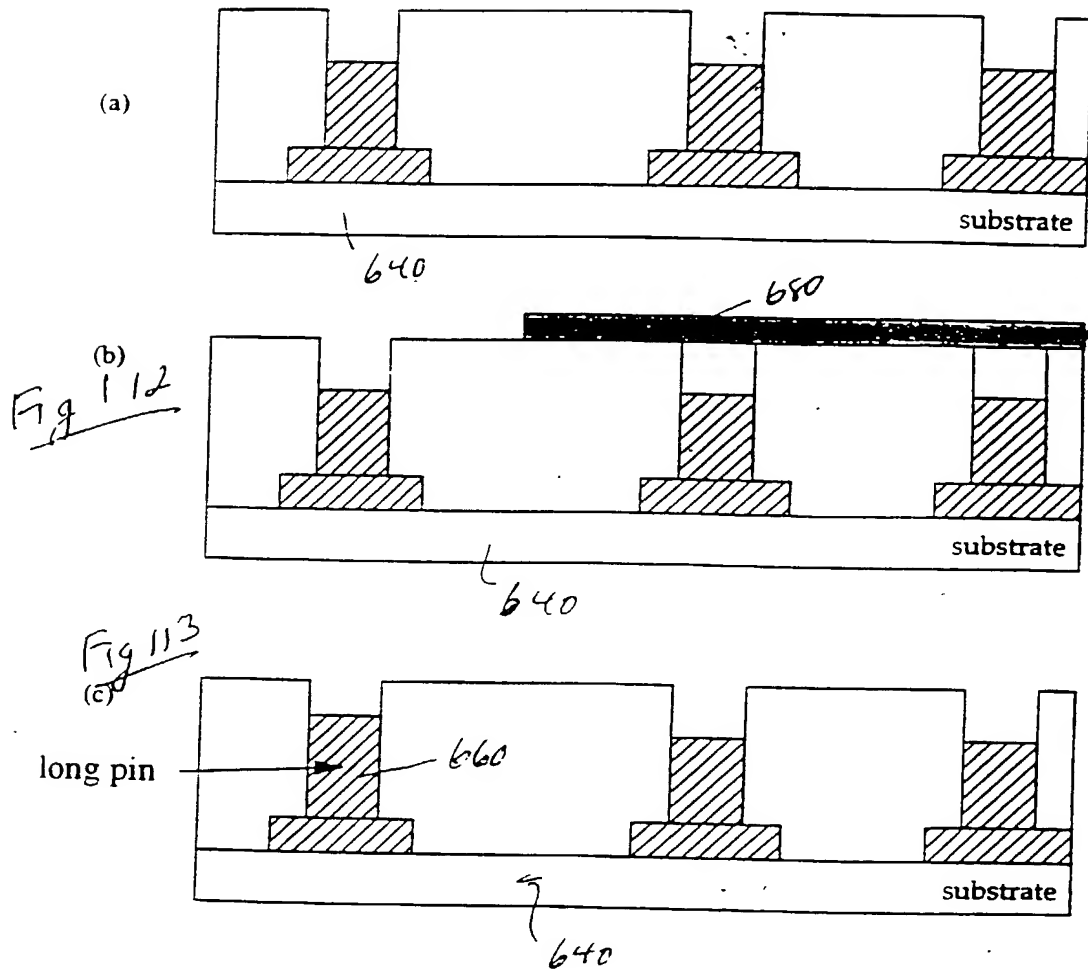
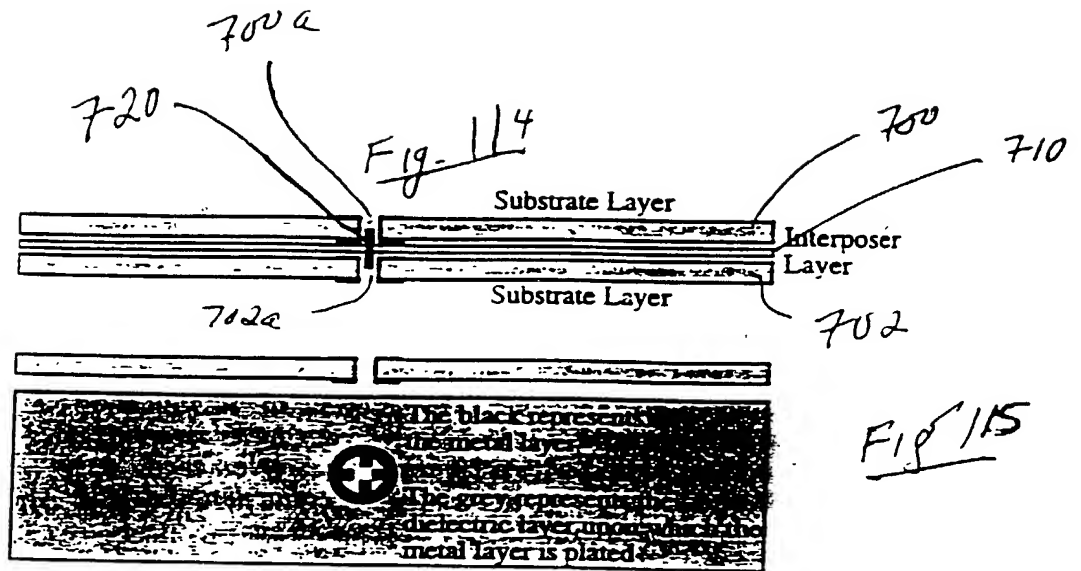
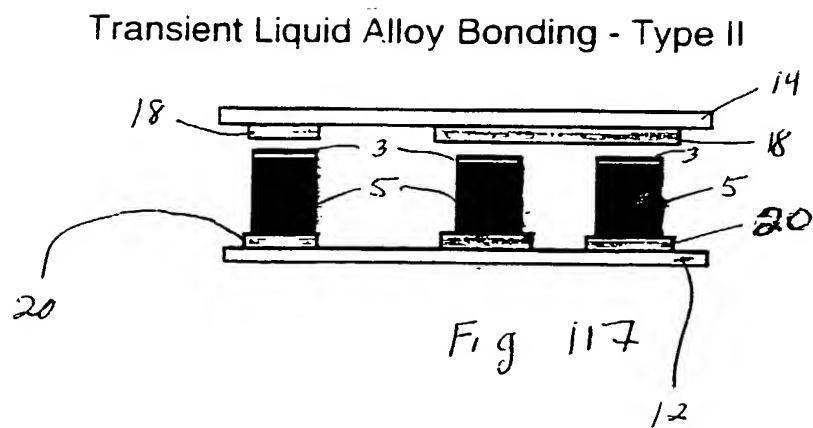
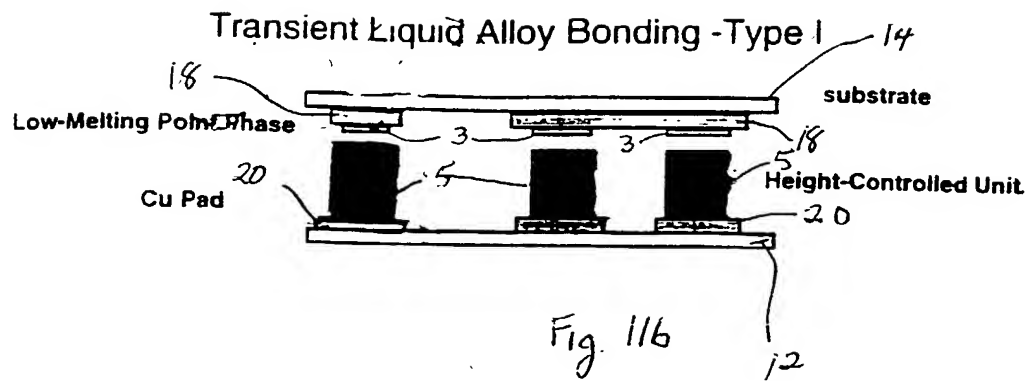
Fig 108Fig 109Fig 110

Fig 11

Another build-up process for long pin







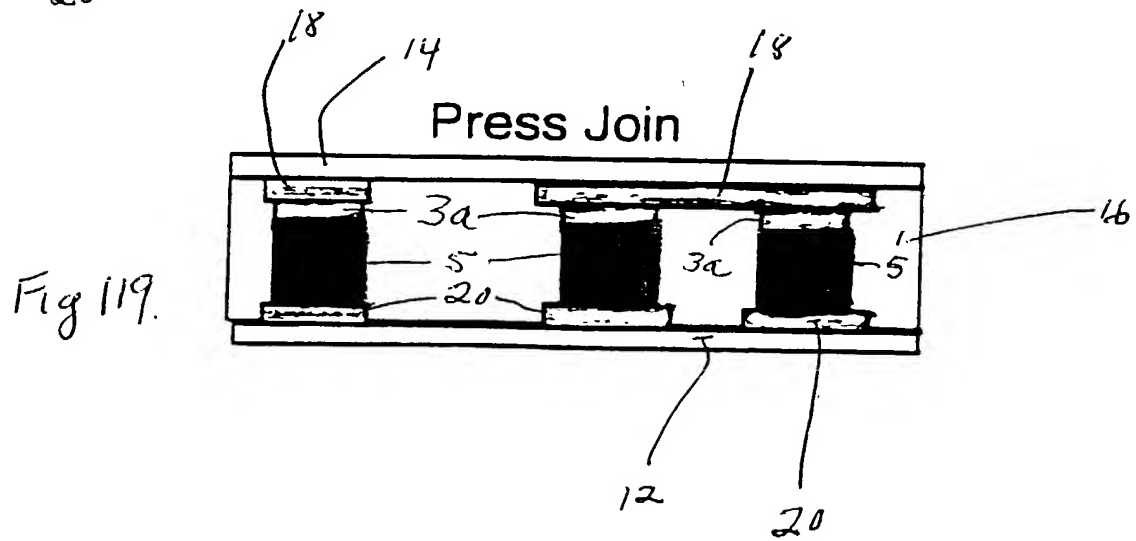
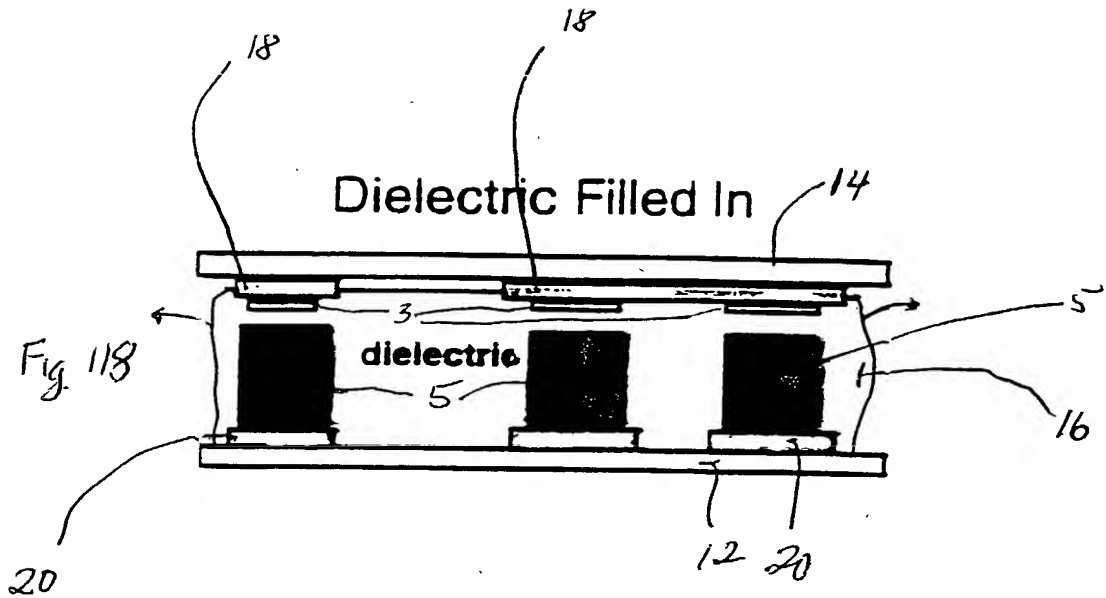
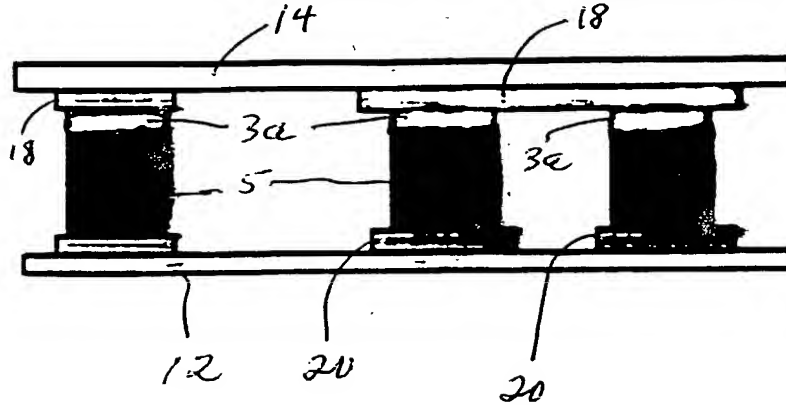


Fig. 120

Press Join with heat



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Dielectric Filled In

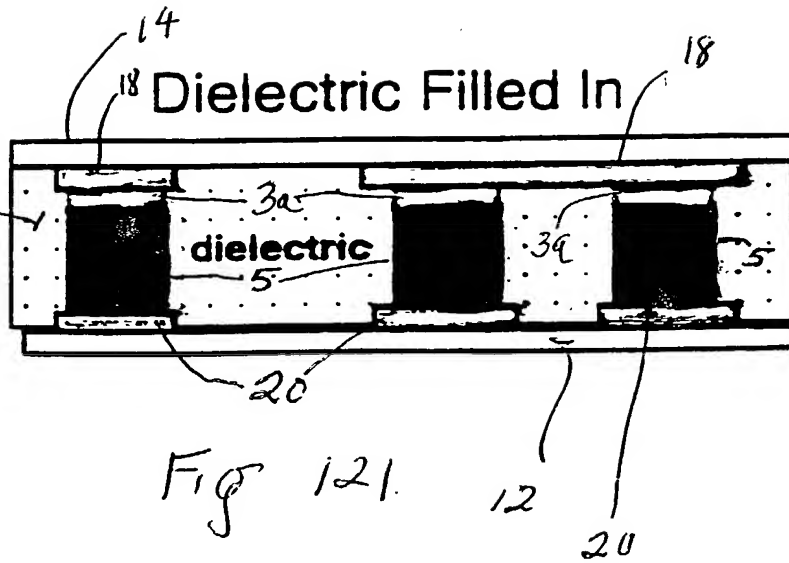


Fig 121.

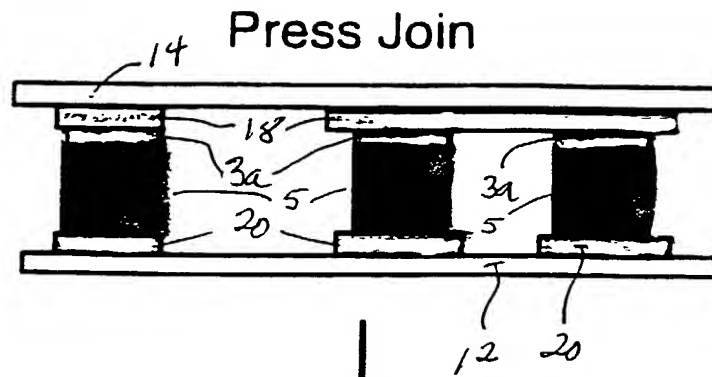


Fig 122.

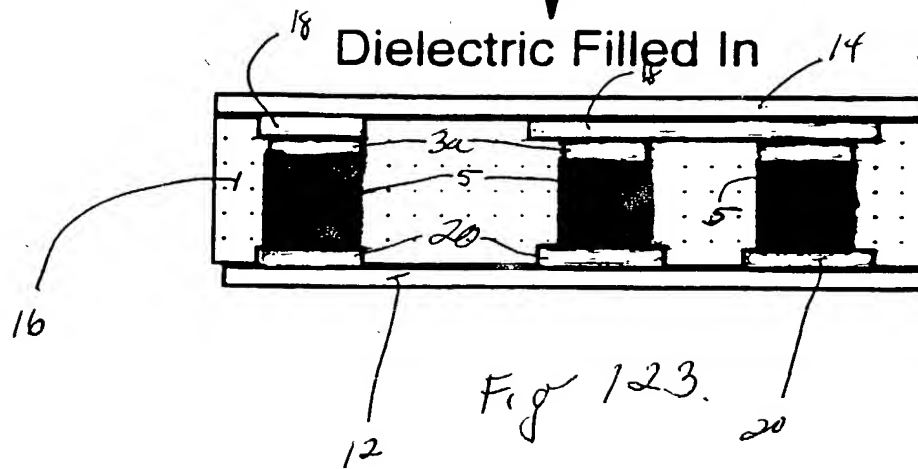


Fig 123.

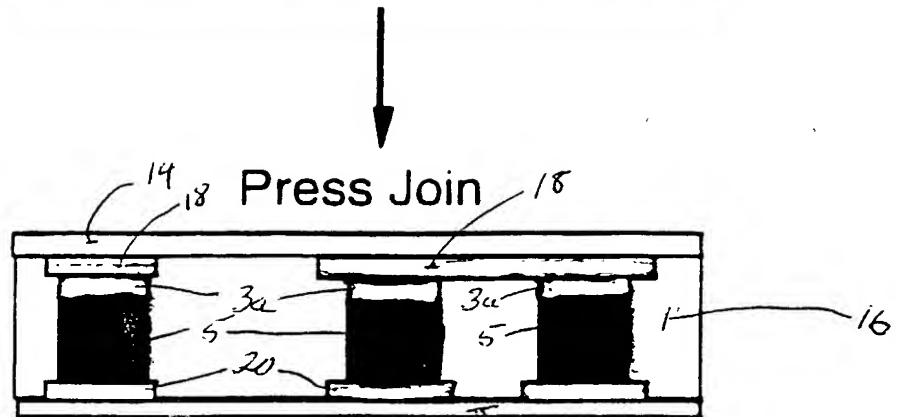
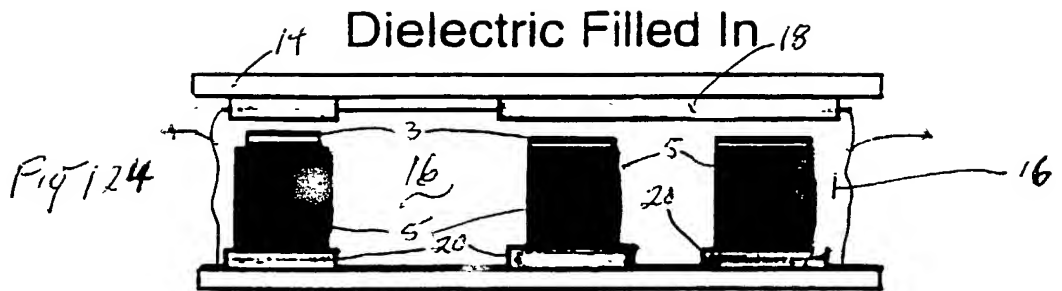


Fig 125

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